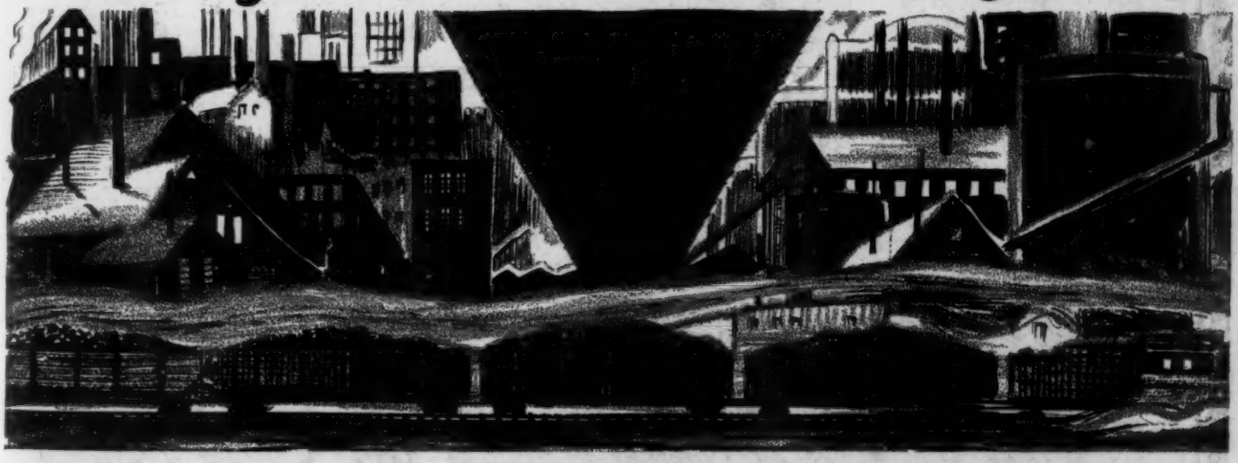
SEPTEMBER 14, 1929

Railway Age

FOUNDED IN 1856

They Are Non-Corrosive



UNION METAL PRODUCTS COMPANY

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This is one of a series on International Tie Service. The next of the series will appear in the Sept. 28th issue.

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IT takes many years to acquire the necessary practical knowledge and treating experience; it takes even longer to build an efficient organization which can produce ties of the highest quality at the lowest possible cost. ***International*** has both—and both have passed the test of time.

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General Offices — Galveston, Texas

Plants: Texarkana Beaumont Galveston

International

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The International Dating Nail

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Railway Age

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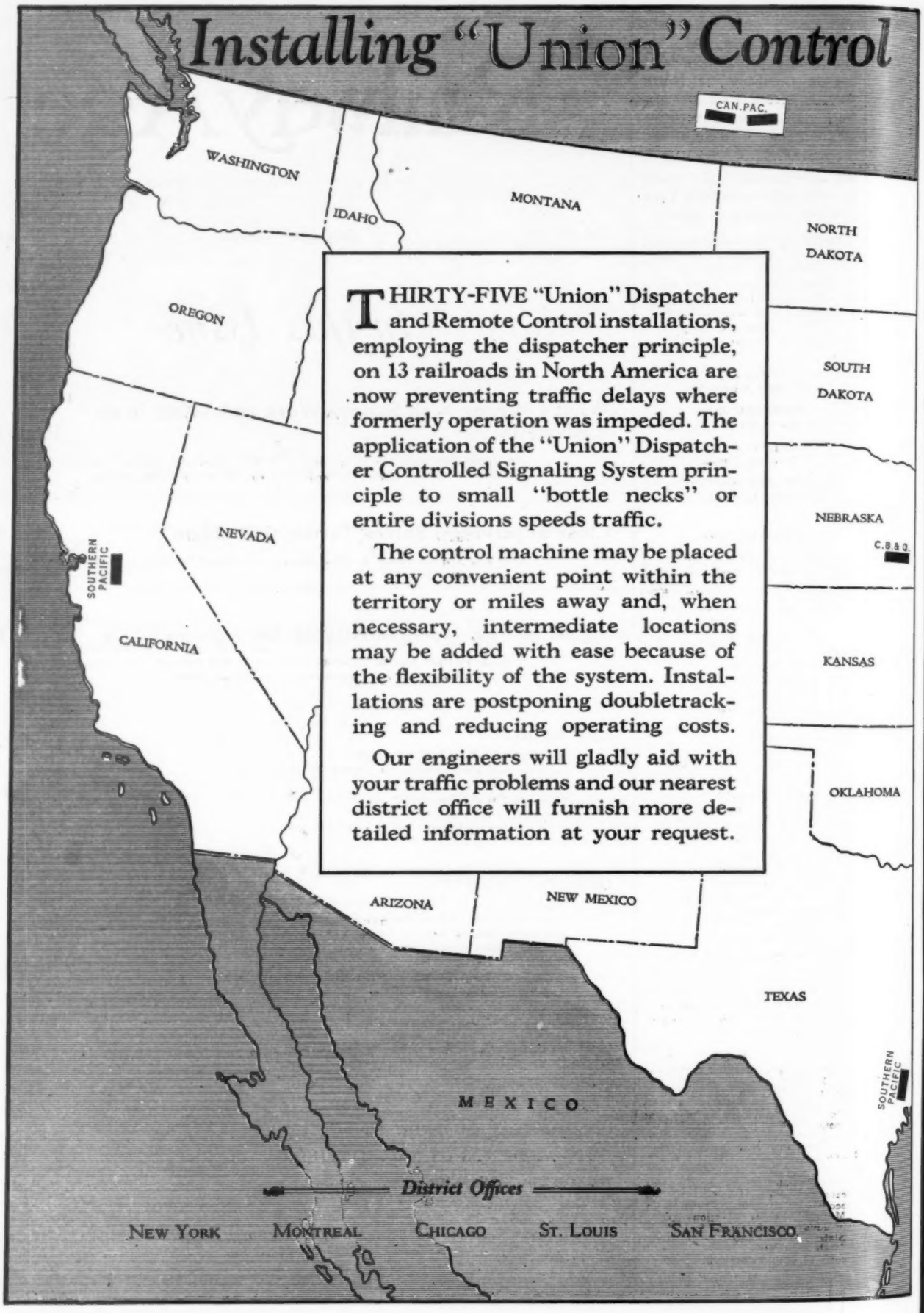
Installing "Union" Control
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MONTANA
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SOUTH DAKOTA
NEVADA
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THIRTY-FIVE "Union" Dispatcher and Remote Control installations, employing the dispatcher principle, on 13 railroads in North America are now preventing traffic delays where formerly operation was impeded. The application of the "Union" Dispatcher Controlled Signaling System principle to small "bottle necks" or entire divisions speeds traffic.
The control machine may be placed at any convenient point within the territory or miles away and, when necessary, intermediate locations may be added with ease because of the flexibility of the system. Installations are postponing doubletracking and reducing operating costs.
Our engineers will gladly aid with your traffic problems and our nearest district office will furnish more detailed information at your request.

Railway Age

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Misrepresentation to Boost Waterways

THE railways are concerned regarding the agitation for extensive development of inland waterways for three principal reasons. First, if such development results in increasing the traffic carried by water this traffic will be diverted from the railways, and their earnings will be affected adversely. Secondly, large expenditures on waterways will increase taxes, and the railways will have to pay their share of these increased taxes. Third, the agitation for waterway development cannot be effectively carried on without misrepresentation of transportation conditions and costs and the railways are constantly being made the victims of such misrepresentation.

The misrepresentation which appears in practically all the propaganda for the development of waterways appears to be due more to the ignorance of waterway advocates regarding transportation matters than to any deliberate purpose on their part to mislead the public. There is hardly anybody in the country who has really studied transportation economics who believes that, under modern conditions, inland waterways, excepting the Great Lakes, can be made to compete successfully with railways on the basis of both service and total costs. No professional economist with a reputation as an authority on transportation matters is advocating inland waterways. The traffic managers of practically all large industrial concerns look with skepticism upon the entire movement, or openly ridicule it. Most of its leading advocates are public men and business men, who, without previous investigation, have started in their reasoning with the premises that water is cheaper than rail transportation and that railways need "relief", and, reasoning from such premises, inevitably reach the conclusion that inland waterways should be developed. If these business men should ever pause to investigate the soundness of their premises, the inland waterway movement would soon lose their support.

Fiction and Facts About Transportation

Typical of the propaganda on the subject which constantly emanates from public men, and the dissemination of which injures the railways and misleads the public, are some remarks made by Governor Theodore Christiansen of Minnesota on August 15, at a meeting of the Great Lakes Harbor Association at Duluth, Minn. Governor Christiansen said that "within the last quarter of a century railroad traffic has grown from 114 billion ton-miles to 338 billion ton-miles." It has actually grown during this period from 173 billion ton-miles to more than 435 billion ton-miles or about 150 per cent.

He further said, "During the same period railroad facilities have not increased correspondingly. Car efficiency has been greatly impaired by the congestion incident to the effort of shippers to crowd a vast amount of freight through bottle necks that cannot handle it adequately. As a result the average daily mileage per car is now less than 20 miles." During the period mentioned the investment of the railways in facilities of all kinds increased from 11 billion dollars to more than 25 billion dollars, or about 130 per cent. There has been virtually no congestion of traffic for six years. The average miles moved by each freight car in 1928 was not 20 miles, but 31.3 miles, and is now about 33 miles, or 65 per cent more than Governor Christiansen stated.

Continuing, the governor said, "There is said to be a shortage of 260,000 freight cars in the country at the present time." There was a surplus of 175,000 freight cars in the very week in which he made his speech. "Even if these cars were provided," he continued, "the problem would not be solved, for adding to the number of cars without increasing the capacity of present terminal facilities would block traffic rather than free it. The railroads of America are perhaps ten years behind the development and normal demand of the country." It is, of course, necessary for the railways not only to have enough freight cars, but to have adequate facilities and efficient methods for moving them, to enable them to render the shipping public adequate and satisfactory service. In the entire year 1928 the railways promptly furnished shippers 99.97 per cent of the freight cars for which they asked for loading. In twenty of the weeks of last year they did not fail to furnish a single shipper in the United States a single car for which he asked. In each of the five consecutive months of April, May, June, July and August, 1929, there were more freight cars loaded than in the corresponding month of any previous year, and yet, except-

ing for a very short period in the southwest, when the loadings of wheat exceeded all previous records, they furnished shippers throughout these months virtually 100 per cent of the cars for which they asked. Can any other industry show a better record? To say that the railways "are perhaps ten years behind the development and normal demand of the country," in view of such facts, is preposterous.

Paying 11 Cents to Save 4 Cents

"The completion of the Great Lakes-St. Lawrence system would, therefore, justify itself in two ways," continued Governor Christiansen. "First, by eliminating the loss resulting from the present congestion; secondly, by providing a means of transportation which is cheaper than transportation by railroad." There is as much basis for Governor Christiansen's claim that the Great Lakes-St. Lawrence waterway would reduce transportation costs as for his claim that it is needed to relieve railroad congestion—that is, no basis at all. Freight rates are not a measure of the cost of transportation by inland waterways. There must also be included the taxes paid by the public in developing and maintaining the waterways. In the exhaustive study of the Great Lakes-St. Lawrence project recently made and published by the Institute of Economics of the Brookings Institution it is estimated that the maximum saving in freight rates on wheat that would be accomplished by the development of this waterway would be 4 cents a bushel, while the cost to the taxpayers of effecting this saving would be 11 cents a bushel. Obviously, it would be much more economical for the taxpayers to give the farmers a direct subsidy of 4 cents a bushel than to subsidize the movement of wheat by water.

The statements made by Governor Christiansen may be regarded by those who have not followed closely the agitation for the development of inland waterways as extreme examples of misrepresentation of transportation conditions for even a waterway enthusiast; but they are not. They are typical of the kind of statements emanating from practically all waterway enthusiasts. A student of transportation economics might be tempted to conclude, after reading a large part of the waterway literature with which the country is being flooded, that numerous politicians, business men and newspapers have joined in a conspiracy to bring about the development of inland waterways wholly regardless of facts, logic and economic consequences. This is not the case. There seems to be something about waterways that tends to cause men who become interested in them to become fanatics, and a fanatic will believe and repeat almost anything that he believes will help his cause, and will hardly listen to anything that he fears will hurt it. When the period of political speech-making, brass bands and fanaticism in the movement for waterways has passed it may be possible to get the subject considered on its merits. Unfortunately, the expenditures of the taxpayers' money made before then may be as reckless as the statements now being made by waterway advocates in support of such expenditures.

Authority and Responsibility for Dependable Accounting

THE Interstate Commerce Commission has stated the opinion (St. Paul & Puget Sound accounting case, 29 I. C. C. 508) that railway accounting officers "understand the true functions of accounts and realize their importance in determining the correct economic condition of the transportation properties with which they are affiliated. Their instincts and training are such as naturally to lead them to keep their accounts as they should be kept. They would not have the confidence of their superior officers if this were not the case."

The responsibilities resting upon railway accounting officers were further emphasized in a circular issued by the commission on March 17, 1928. This circular reiterated the doctrine of independence for and reliance in the opinions of accounting officers regarding accounting matters and asked for copies of any rules or regulations governing the accounting departments. The plain intent of this circular was to insist upon independence for accounting officers and to disclose any conditions, if such existed, making for any possible lack of complete accounting department responsibility for the accuracy and impartiality of railroad accounts. The necessity for fixing direct responsibility upon the accounting departments seems obvious in view of the importance of accounting records in any scheme of public regulation. The responsible accounting department officer is required to swear to the truthfulness of his accounts. Unless he enjoys comparative independence as far as his own duties are concerned, it might be difficult for him conscientiously to assume such responsibility.

The commission has a Bureau of Accounts upon which it must rely for its accounting information in exactly the same manner as the individual railroad relies upon its own accounting department. Is there any reason, therefore, why the Bureau of Accounts should not be entitled to, at least, the same degree of confidence and support on the part of the commission which the commission specifically accords to the railroad accounting officers? Or is there any reason why the Bureau of Accounts should not be relied upon by the commission for guidance in accounting in the same manner which the commission plainly insists that railroad managements should depend upon, rather than interfere with the professional work of railroad accountants?

The hearings in *Ex parte* 91, the general accounting revision case, were held for the purpose of securing suggestions or criticisms from any source regarding a

revision of the railroad accounting classifications which had been prepared by the commission's Bureau of Accounts (page 1571, of the record). Strangely enough, however, these proposed classifications received but little consideration during the hearings, except from the railroad witnesses. Almost the entire hearing and the greater part of the discussion of the testimony in the proposed report (*Railway Age*, August 31, page 559) were devoted to cost accounting, a subject upon which the Bureau of Accounts had clearly and specifically given its opinion a year before the hearing began. The director of the commission's Bureau of Accounts is quoted as stating (page 2805 of the record):

> Our experience has been that the assignment of expenses to determine the cost of transporting any specific class of business must be through special studies. Any attempt to show in the financial accounts of carriers currently the expenses of all classes and kinds of business carried could only be effected through imposing upon the carriers enormous burdens of expense in accounting.

The proposed report in the general accounting revision case would prolong for an indefinite period the consideration of cost accounting, concerning the practicability of which the commission already has the very definite opinion of its Bureau of Accounts.

If the commission should adopt the proposed report in essentially its present form, therefore, it would appear to be difficult to construe such action otherwise than as a depreciation by the commission of the value of the opinion of its own accounting experts. If experts are employed to solve technical problems and their advice is not utilized, the question arises—of what further use are the experts?

Fortunately, however, the present report is only a *proposed* report. The railroads and others interested still have ample time in which to file briefs. In them they may present to the commission their opinions as to wherein the proposed report may fall short of a reasonable degree of perfection. In our opinion there is no feature of the report so promising of profitable discussion in brief as the emphasis placed therein upon cost accounting.

Manifold Billing

WHEN the movement of merchandise traffic was slow the handling of merchandise billing presented few problems. All that was necessary was to bill a shipment at any convenient time, and put the bill in the mail, and it was sure to arrive at its destination ahead of the slow-moving car, even on short runs. Under these conditions, there was little need for improvement in billing methods.

With the speeding up of merchandise schedules within the last few years, the situation has changed. Where formerly a day or two one way or the other was of little moment, now hours and even minutes count. After the transportation department has exerted every effort to deliver a car of merchandise in a short time, it is manifestly inconsistent with efficient operation to delay the delivery of shipments in such cars by reason of the absence of billing. In addition, delays to billing frequently mean exceptions, which, in their ultimate form of claims to be paid, represent a distinct economic loss.

For these reasons, prompt and accurate billing assumes an added importance, and in fact becomes a necessity, if efficiency is to be secured. Various methods have been adopted to meet the situation. One of the most successful has been the practice of manifold billing, whereby the complete "received" station expense bill is typed in the same operation as the waybill. In one case where this is used, the freight waybill, the freight bill, the cashier's memorandum, the arrival notice, the delivery receipt, the station record, inbound and outbound, and the tally sheet, are all made at one operation.

This method has many advantages, in addition to the saving in time, as compared with the separate preparation of these documents. The freight bill and office record are exact copies of the waybill, thus eliminating possible errors in copying. Arrival notices are instantly available and there is a considerable reduction in station expenses. Most important, however, is the fact that shipments are not delayed through lack of the necessary papers, a situation that is inexcusable in most cases, and highly expensive.

Why Not Pay As You Save?

THE railways as a whole are more prosperous now than they have been for years; but all railways are not prosperous. The making of improvements that would save expenses would contribute more to the prosperity of such roads than anything else; but in order to make improvements it is necessary to raise capital, and many roads cannot raise enough capital because they are poor, and stay poor largely because they cannot raise enough capital.

A method that has been adopted for financing improvements of various kinds for which full payment could not be made at once has been that of virtually buying them on the installment plan, and, in effect, paying for them out of the savings resulting from their installation. It has been demonstrated, for example, that substantial savings in operating and maintenance expenses can be made by certain recently developed signaling improvements, such as centralized-dispatcher control, car retarders, and automatic interlockers. A prominent railway signal officer has pointed out that the savings resulting from one of the first installations of centralized-dispatcher control were within 5 per cent of the estimate.

If it is possible to forecast so accurately, and if, as in most cases, the savings from signaling facilities will

pay for themselves in less than 10 years, why should it not be arranged, in cases where the capital cannot readily be borrowed in advance, to finance them on some deferred-payment plan?

If a railroad management is skeptical as to the earning capacity of a project recommended by its signal engineer, and if a signal manufacturing company is willing to undertake the installation on the basis of "pay as you save," thus demonstrating its confidence in the soundness of the contemplated project, the railway stands little chance to lose and much chance to gain, if the agreement with the signal manufacturer specifies exactly the methods of payment and of computing the actual savings.

As a matter of fact, the manufacturers of signaling equipment have pursued a policy of accepting contracts wherein the payment is spread out over a period of three or four years. Moreover, some of the manufacturers have expressed themselves as being prepared to continue this policy on a larger scale in future. "In view of the obvious advantages to both buyer and seller, arising from the adoption of this up-to-date method of merchandising," says one manufacturer, "it is my belief that the deferred-payment plan is destined soon to be much more generally employed than at present."

Although a partial payment plan may be an expensive method of procuring credit, a railroad company cannot always be the chooser when it comes to securing capital. It would seem that the deferred-payment plan possesses enough possibilities to warrant more attention in the railway field than it has received.

Popularize Long-Distance Travel

RAILWAY passenger traffic officers are seriously disturbed over the loss of passenger business at a time when the American public is doing more traveling than ever before. A check-up of some of our vacation resorts indicates that great numbers of people are coming from long distances in private automobiles. Might it not be well to find why people travel such long distances in this way at some discomfort, rather than to use the railroads?

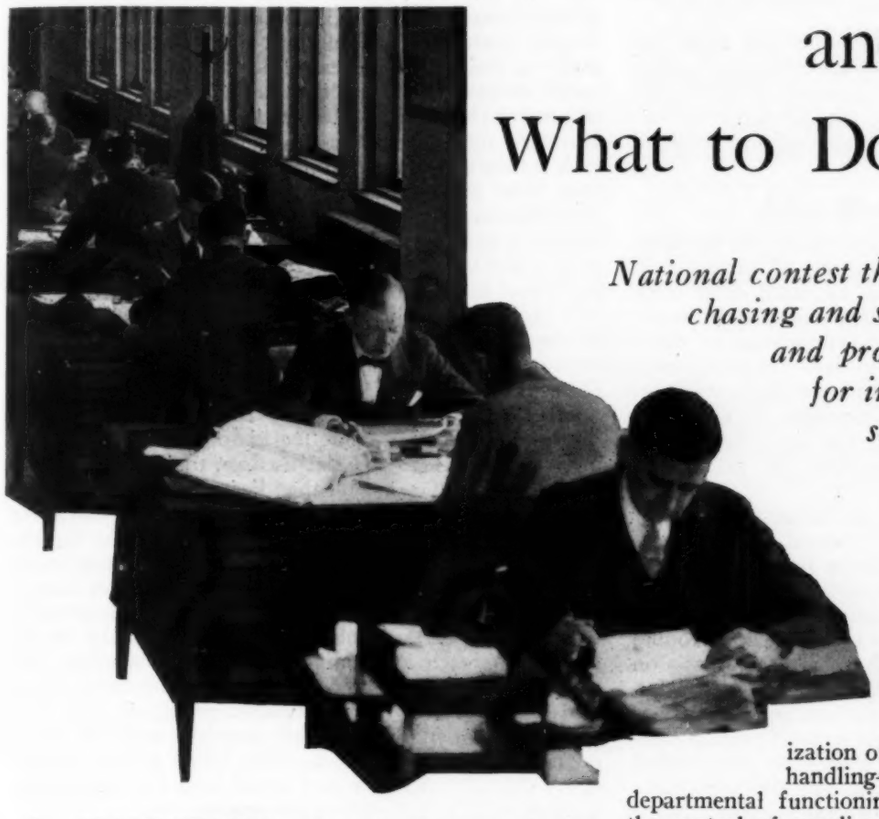
One reason, which may be of some considerable importance, is that many people, particularly from the country and the smaller places, are not accustomed to traveling by railroad. They have read advertisements about the de luxe trains with all sorts of special services about which they know nothing, and they have also read in the newspapers or in current literature of the Pullman porters, their tips, etc. Just how they visualize traveling in a Pullman car is hard to guess, but undoubtedly many of them, who could well afford to travel in that way, fear to do so because of their lack of knowledge about living habits on a Pullman car. They would very much prefer to sidestep this fearful and wonderful experience and knock around in their own cars, living in tourist camps, where they need not put on any sort of front and can behave naturally. Doubtless, on the other hand, many Pullman travelers would be fearful of entrusting themselves to life at a tourist camp. Is it not possible to find some way of making the non-railroad traveler less fearful of entrusting himself to long distance travel on a railroad and in Pullman cars? Could this class of travelers be attracted if less stress were placed upon de luxe travel and more upon the ease and facility with which one may become accustomed to Pullman car practices? Can some way be found of relieving their minds of a fear of the Pullman porter?

St. Louis-San Francisco Test Locomotive Run

OF more than passing interest is the recent endurance run, of 7,350 miles made by St. Louis-San Francisco Mikado locomotive 4115, without having its fire "knocked", or receiving mechanical attention at terminals en route. The locomotive was under fire a total of 587 hours, from July 19 to August 13, consuming over one and one-half million pounds of coal (80 per cent from Alabama mines) and somewhat over one million gallons of water. It rendered over fifteen and a half million gross ton-miles of service during this test period, and the unit fuel consumption was almost exactly 100 pounds of coal per 1,000 gross ton-miles. The average tonnage handled on all divisions was 2,171. During this test 60 crews were used, one of which "caught" the run five times. The usual allowance of four pints of valve oil and eight pints of engine oil on each subdivision was made for lubrication, a total of 240 pints of valve oil and 480 of engine oil being consumed during the entire test. Inspection subsequent to the test showed four small tubes stopped up, about one bushel of cinders in the combustion chamber and one leaking staybolt. The locomotive was otherwise in excellent condition, including the boiler interior, running gear, brick arch, grates, ash pan, stoker and front end. Owing to the effective treatment of water furnished from 15 different points between Kansas City and Birmingham, Ala., and the method of blowing off, no scale was found on washing out the boiler and only a small amount of mud around some of the washout plugs. The satisfactory conclusion of this test run constitutes a real achievement for the St. Louis-San Francisco, demonstrating as it does the possibilities in the way of intensive locomotive utilization and the fact that in general, under proper supervision, fire and mechanical conditions need no longer be the limiting factor in the distance locomotives can successfully operate.

What's Wrong with Supply Work and What to Do About it

National contest throws spotlight on purchasing and stores departments and produces ideas for improving service



A "BACK-STAGE" review of railway purchasing and stores operations was produced recently when the Purchases and Stores division of the American Railway Association conducted an essay contest among the younger men in these departments of the railroads. Under the stimulus of this contest, which was the third of its kind held by the division and was open to all purchasing and stores department officers and employees below the rank of assistant purchasing agent and assistant general storekeeper, over 30 storekeepers, clerks and foremen from approximately 20 different railroads prepared papers about supply work. In these papers, which contained over 50,000 words, and include, among their topics, requisition writing, purchasing, surplus stock, inventories, material handling, testing, office details, organization, fire prevention and safety, the younger men of the purchasing and stores work express their aspirations and reveal supply operations as the men at the requisition desks and the stores and shipping rooms see them.* The supply department is pictured as engaged in an important work which is being done creditably as a result of the remarkable progress made in organization and facilities, but with much room for improvement. More rigid adherence to recognized principles are recommended for solving some of the problems, while new methods are suggested for others.

More Centralization Needed

After declaring the fundamental purpose of the supplying department to be the economical purchasing, handling, storing, distribution and reclaiming of material and supplies, Joseph DeGraff, stores inspector of the Southern Pacific at West Oakland, Cal., prescribed centralization—centralization of authority and centralization of handling—as the prime need in better departmental functioning. It is vital, he writes, that the control of supplies and materials should be vested in a single individual, while the supplies must be centralized, not only to afford this control, but with a view to their economical handling and application.

The present system of stores delivery, which is in use on nearly all the larger railroads, shows the advantages of placing supply operations under the direction of a single individual. Mechanics used to go to the store, often accompanied by their helpers and sometimes by laborers, to get the supplies they required in their work. If the item was heavy, it was then necessary to hunt some one to handle it by wagon or train. Usually a mechanic would make at least two trips to the store a day and it was rare that some item was not forgotten in these trips and required additional trips to secure it. Idle lathes, drills, blacksmith fires and other machinery and equipment, as well as wasted labor, resulted.

Every few minutes under the centralized plan effective on the Southern Pacific, store delivery forces collect the requisitions for supplies and deliver the material to the work on the next trip unless it is required immediately, when it is sent by special messenger. If the material is heavy, it is handled immediately by auto truck or crane, and if an item is overlooked when other material is ordered, a telephone call will correct the oversight without waste of time. The quick handling of material to the job under centralized operation is a big factor when it is appreciated that approximately 44 cents of every dollar of railway income is expended for labor.

Another costly condition, Mr. DeGraff writes, is the failure to consolidate all auto trucking service under

* The two winning papers were published in the *Railway Age* of June 29, 1929.

one department. Without such a consolidation, each department handles its equipment without giving any thought to the work of other departments, with the result that lost motion prevails. Consolidating this work results in economies in the use of equipment and also in its repair.

Where reclamation is handled under one head, according to the same writer, an experienced organization results which not only reduces the amount of serviceable material which reaches the scrap, but increases the volume of discarded material that is repaired and returned to use.

Too Much Surplus Material

One of the major problems incurred in the handling of materials by the stores organizations of various railroads, advances Leslie W. Gross, assistant chief clerk of the Boston and Maine stores department at Billerica, Mass., is that of preventing the accumulation of obsolete surplus and slow-moving material. Its importance may be judged from the fact that the total value of such stock on a large railroad amounts to eight per cent of the total stores balance. The carrying charges alone of such investments are equal to the salaries of at least 20 storekeepers.

Much of the surplus arises from locomotive and car work. Some roads employ one or more stores men at their large locomotive and car shops to follow the reports issued by the mechanical forces as a result of advance inspections made of locomotives and cars subject to repair. These advance reports promote shop production without interruption, but there is a tendency on the part of stores and mechanical forces to overorder, simply for protection. When the equipment reaches the shop, it is often found possible to weld certain castings instead of replacing them with new parts called for in advance inspection reports. If the new parts have already been ordered, they become surplus. Some of this surplus can be prevented if the store is immediately notified so that orders for the new material may be cancelled.

Shop Forces Delinquent

Surplus also results from the failure of shop forces to notify the stores promptly of radical changes in policy. Unless the stores are aware of an impending change in policy, they will order on a consumption basis. When locomotives and cars are being retired, the stores should know of this several months, or even a year, previous, to avoid purchasing obsolete material.

There is a tendency in some shops to request shop orders for advance boiler or firebox work, solely on the assumption that when a locomotive reaches the shop for general repairs it will need a firebox. As a result, fireboxes are sometimes held a year to a year and a half before they are used.

More care should also be used in the classification of tires when removed from locomotives during shopping. Numerous changes occur when tires, classified as second-hand by the shops, are actually found to be scrap when sent to some other point.

When ordering expensive items for additions and betterment work, the time for delivery should be specified so that the stock balance can be kept at a minimum and the stores not confronted with the problem of holding such items as superheater equipment, compound pumps, etc., from six to eight months before their application.

The average railroad, and the purchasing and stores department, Mr. Gross says, can save thousands of dollars yearly by appointing a stores man, familiar with blueprints and specifications, to spend all his time in consultation with shop forces and the mechanical engineer's office, and watching stores men in their ordering. In this way, material will be ordered to correct specifications, thus lessening chances of more obsolete surplus material accumulating, and when a change of policy is desired, the stores will know about it well in advance. He also recommends that a special man be employed at general stores or at other stores to handle the surplus and slow moving material that actually accumulates.

A somewhat similar proposal is made by John Brennan, chief clerk to the district storekeeper of the Missouri-Kansas-Texas, at Waco, Tex., who would discontinue the general practice of the stores being furnished with a list of the material required for locomotive repairs that is prepared by inspectors while the engine is still in service. The stores department should only be advised that the engine is nearing the completion of its required mileage and the approximate date fixed for the repairs. When this information is received, the district storekeeper should notify the storekeeper on the division where the locomotive is operating and furnish a list of all special material used on that equipment.

The storekeeper should then keep in close touch with the roundhouse foreman or master mechanic, and when the time is definitely determined for removing the engine from service, this officer and the local engine inspector should make a reliable report of the actual items of this material required. A stores material supervisor should also be employed at the shops to make an inspection of each locomotive as it enters the shop. He should confer with each of the shop supervisors and obtain a schedule of the deliveries required and then check this list of the materials required with the stock on hand in the storehouse. This check would prevent many delays to material and would keep the storekeeper in closer touch with the requirements.

More Handling Equipment

Repeated reference is made in the papers to the need for more material equipment in supply work. Among the advocates of this is R. G. Becker, division storekeeper of the Northern Pacific at St. Paul, Minn. The installation of modern equipment in stores operation, he writes, is lacking in many instances and has not kept pace with the improvements in buildings. The two-wheel warehouse truck and large labor gangs are too much in evidence in handling material around storehouses. Push cars and dollies are still used to a great extent, especially at local and division storehouses.

It is Mr. Becker's idea that local stores serving a roundhouse and freight repair shop should have an air hoist for loading wheels, and a tractor with 10 or 12 trailers. The reduction in labor expense will pay for the equipment in the first year. No division store should be without a tractor and trailer. Should the skid system be adopted, a truck-tractor should be included in the equipment. Such equipment will cut the cost of handling at division stores in half, for one man could do what three and four do now. Since most division stores serve one or more local stores and usually make many express shipments they should also have an auto truck to handle express shipments and to make deliveries to bridge and building crews, to sections and to freight houses. This would not only quicken service, but reduce the use of revenue freight cars.

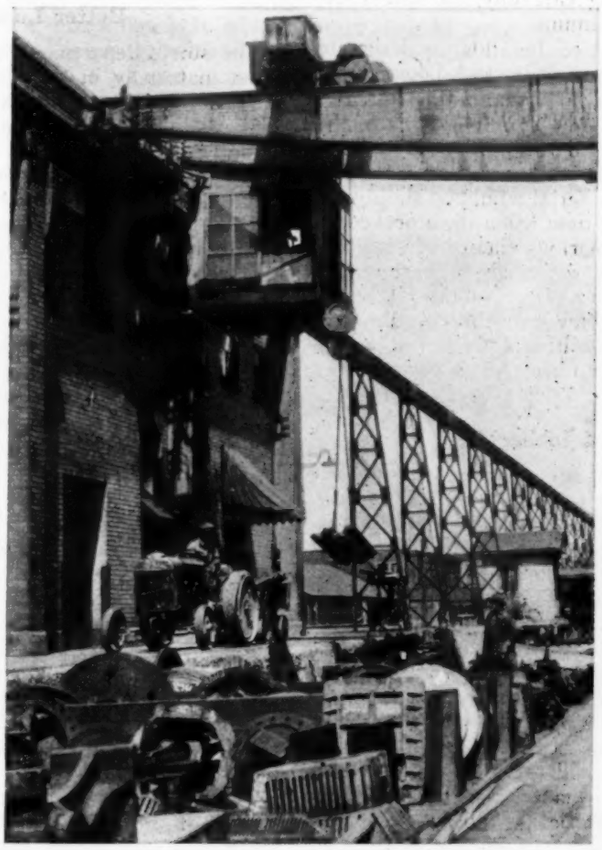
Where an average of one car load of scrap, or more, is loaded weekly, two or three specially-equipped cars should be available for such service, as a part of the

material-handling equipment, and a scrap dock should be built so that trailer loads of scrap can be dumped into waiting cars without rehandling. The old method of trucking and loading the accumulation of scrap from a scrap dock to the car is a thing of the past.

A New Type of Storehouse

B. A. Oliver, chief clerk to the division storekeeper of the Southern at Birmingham, Ala., has a new idea for storehouse buildings. Store buildings, he writes, are now receiving a marked degree of favorable consideration and the result is already manifest in modern well-appointed and permanent structures. However, the proper locating of stores buildings is not making proportionate progress. The practice of locating the material storehouse on the most available plot, after all other buildings are located, reflects a policy that is haphazard instead of efficient. Why place the source of supply 100 ft., 200 ft., or even further away from the point of service, he asks.

Would it not be better if the main storehouse were built parallel to and integral with the machine shop, with brass, iron, steel and other castings, and cylinders, tires, etc., that are ordinarily stored outside on platforms, placed under a crane runway on the same floor level with the shop and delivered by one- to five-ton overhead electric cranes directly from their storage to the machine. The cranes could also unload these items from the cars, which would be received on a track placed inside and on the side of the building opposite to the storage. The shop machines would be grouped so that mechanical conveyors installed beneath the floor could convey the borings, turnings and drillings from each group of machines to chutes or shop cars and thus eliminate the labor expense of handling them. Where necessary, a second, or balcony floor, or even a third storage floor could be built in the store section of the building with chutes to deliver the material to points of use. Such concentration would reduce operating costs in the machine shop and promote economy in handling.



Handling Material on the D. & R. G. W. at Salt Lake City, Utah

Watch the Freight Car Material

There is a great deal of room for improvement in the storage and handling of material in freight car repair yards, according to C. H. Nichols, storekeeper of the Northern Pacific at Minneapolis. At many places, the car forces handle this material, the store department merely making a monthly check for purposes of making up requisitions for replenishing the stocks. This stock-taking requires more time than necessary. All freight car repair material should come under the direct and specific control of the stores department, which should have facilities and equipment for properly caring for this material and issuing it.

It is also important to a better control of all material and the avoidance of unnecessarily large accumulations that stock books should be checked with the material on hand periodically to ascertain any surplus. This work should receive as much attention each month as is given to replenishing the stock. Any material noted as surplus should be marked in the stock book. Only by keeping a constant check and properly disposing of this material can the aggregate stock on hand be kept at an economical minimum.

Furthermore, the quantities of material to be ordered for replenishing stock should be inserted in the stock book on the ground when counting the stock and any unusual increase or decrease in the consumption should be investigated at once.

Cabooses are frequently supplied with material ordered on requisitions filled by conductors. Where these requisitions are not turned in by conductors to the storeroom, there should be a special place for receiving them, preferably in the yard office, so that they can be picked up by store men at designated periods. The conductor should report the caboose number and the time of day when leaving the requisition and the store man, when picking the requisitions up, should mark the time, date and his initials on the same form. In this way, a complete record of performance is furnished and errors avoided.

The adoption of a specific date for taking annual inventories on railroads will promote accuracy and reduce the expense of this work, according to J. A. Powers, head clerk of the Southern Pacific stores, Tucson, Ariz. At present, each railroad takes inventory in accordance with its own schedule. This produces results entirely different from the majority of other roads. If a uniform date were set standard practice could be perfected. A time should be selected that will assure accessibility of all items for an accurate test, and the heads of all departments should furnish all assistance necessary to assure a complete and accurate inventory. To deal effectively with stock control, moreover, the figures should be available at conventions in order that all may profit by the experiences of other lines. At present the lack of a uniform plan is a serious handicap.

A great trouble in ordering material, according to J. H. Sagarsky, chief clerk of the Northern Pacific stores, St. Paul, lies in the fact that those ordering this material

are not aware of the actual money the material represents. As a step in improving this situation, he suggests that the department ordering special material and not using it immediately should be charged directly not only with the purchase price of the material plus a nominal store expense, but with the carrying costs. Stores expense is an initial charge, but not the only charge. Would it not be a good practice, he asks, to include an operating expense applied to each unit at every inventory period, based on the storage and all other handling charges? This would act as an incentive to absorb the surplus special material promptly and would also promote more care in ordering, thus enabling the storekeeper to move the material more quickly.

Moreover, every storekeeper should know just what it is costing annually to maintain the store. This would give him a basis of checking carefully the stores expense and keeping it at a minimum.

Would it not be good practice, he adds, to designate all second-hand reclaimed materials in stock books. The stock books would then show at a glance the quantity of such material on hand. This would facilitate the substitution of second-hand and reclaimed material for new material.

The problem of ordering material would be simplified, moreover, if the approximate time when the storekeeper would receive the supply of various classes of standard material was determined and recorded. Where standard material is ordered month after month, it seems that some method could be devised whereby shippers could complete their deliveries within a prescribed period, thus enabling the storekeeper to keep his stock in proper control.

Buying from Jobbers

In a paper dealing principally with purchasing activities, Henry Belmore, receiving clerk on the Duluth, South Shore & Atlantic, at Marquette, Mich., maintains that purchasing departments would profit greatly if the orders for the material purchased were placed directly with manufacturers of the goods instead of being obtained through jobbers who "inflict upon the purchasing and stores department a price that is over and above the manufacture of the goods." Particularly could hundreds of dollars be saved by the proper placing of orders for electrical appliances and for track material direct with the manufacturer. He also believes that the supply departments will profit by an increased amount of purchasing on a quantity basis, contending that a great deal of this material is now being purchased under conditions where the quantities ordered are not large enough to secure discounts. Purchasing and stores departments can also profit in distributing their buying activities more widely instead of confining purchases to a small number of companies. In connection with the purchase of commissary supplies, more local buying is the solution of reductions in this branch of purchasing activities.

More Care with Requisitions

One of the most important factors in stores department work, advocates M. F. Lyon, clerk to the general store foreman of the Missouri-Kansas-Texas at Parsons, Kan., is the issuing of material. Much interest has been centered on the proper storing of material and the proper marking of bins and other features that make a first-class storeroom, but the proper filling of requisitions should receive equal attention.

On the Missouri-Kansas-Texas, about 15,000 to 18,000 requisitions are received at the district storekeeper's office in Parsons annually and this does not include the orders used in connection with issuing material to the locomotive shops, the roundhouse and the car department. Practically all of the requisitions originate either in the various district offices or the line storekeeper's offices. Those originating requisitions should use every precaution to give the correct name and description of each item listed, the correct shipping destination and other information required in filling the form. Much delay and many mistakes in shipping articles can be eliminated when this information is given. One thing that is frequently overlooked when a complete unit is ordered is the time required in preparing some of the material. The storekeeper should immediately see that all parts are in stock and arrange to secure the material that is necessary to complete the unit.

Better Loading of Cars

The stores department, continues Mr. Lyon, can also assist materially in quickening freight movement by properly loading cars. Cars should be loaded with the contents in station order so that the distribution can be made with the least delay, and loading above the maximum capacity as well as the careless distribution of the contents in the cars should be avoided.

F. C. McElwee, oil house foreman of the same road at Parsons, enlarges upon the subject of requisitions. He suggests that when issuing material to roundhouses and shops, the store men should fill out all the forms instead of the shop foremen. We have about three-quarters of these forms to write over, he writes. The workman tells the foreman what material he wants and the order is filled out, but often incompletely. If the storeman filled out the order, the engine number and other required information would be given in proper form.

Too Much Strife

The great trouble in supply work, points out John L. Dorsey, material accountant of the Utah Railway, Salt Lake City, Utah, is the lack of co-operation between departmental forces. In practically any railroad shop one may visit, he will find departmental strife, which hampers economical operations. When a storekeeper is found with his shelves burdened with slow moving material, it is commonly explained that the material was ordered on special requisition by the master mechanic or by the bridge and building or water service departments, and no questions were asked as to the necessity of ordering such large quantities, while master mechanics and others responsible for ordering special material which is not used after its receipt frequently explain that the special requisitions had been made in order to avoid shortages experienced on previous occasions and without asking the storekeeper how soon the delivery could be expected. Likewise, special requisitions for material are often found to have been made in order to assure getting a more satisfactory quality of material than the purchasing agent persisted in buying for the regular stock. Co-operation, argues the writer, is essential to economical stores work.

More Standardization

W. A. King, storekeeper of the Union Pacific at St. Joseph, Mo., advances the claim that railroads have been investing money unnecessarily in surplus and obsolete material and advocates more standardization to reduce it. Changes in plans, standards and equipment, he writes, usually result in obsolete material. These changes are necessary to progress, but consideration should always

be given to the material on hand that would become obsolete by such changes. Notices of changes in standards covering new appliances and equipment should include instructions concerning the material on hand, and as much advance information as possible should be furnished the store department to allow it to curtail the further ordering of material that will not be used again.

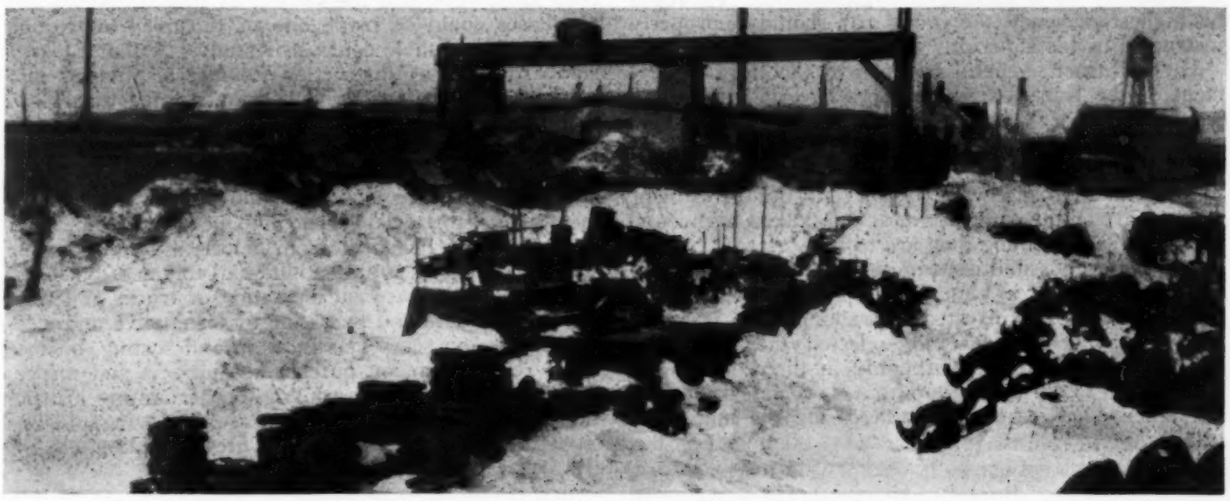
Railroads should standardize on tools, appliances and equipment as far as possible, in order to reduce the variety of such items that are carried in stock, and the authorized standards should be adhered to by users of the material. Often this is not done because the users are not familiar with the standard items which are listed completely in stores department stockbooks, and it is left to the storekeeper to check the requisitions received from other departments, which specify various catalogues to determine if there are standard items listed in the stock books which will suffice. It is very easy, he writes, for a storekeeper to accumulate surplus and obsolete material, but it takes the combined efforts of every department to avoid it.

A Bureau of Railway Standards

J. D. Kerr, clerk in the store department of the Missouri-Kansas-Texas in St. Louis, enlarges upon the discussion of standards by advocating the creation and maintenance of a national bureau of railway tests and standards, operated under the direction and control of a committee from Division VI, A.R.A. This bureau would be located as centrally as possible and have every facility for conducting its work. The original outlay would be large, but the cost of maintenance and operation would not be a burden to the members. The bureau would include a division of tests to investigate the class of material or devices that are now considered too expensive for any one road to test and would also test the great variety of smaller items of material whose consumption on a single road is too small to warrant an individual investigation. The division would also compile individual tests made by member roads at stated intervals. Such a bureau would also function similarly to the U. S. Bureau of Standards in developing standard specifications for staple articles of railroad use and thus secure uniform quality and promote better prices through the simplification of manufacturing practices.

A central bureau of standards is also advocated by C. W. Smith, surplus material clerk, Southern Pacific at El Paso, Tex., who adds that it would also be possible under such a plan to exchange lists of surplus material on hand with a view to its disposition. At present, railroads are unable to exchange surplus or obsolete material because of the different standards which prevail. With an organization of this kind, equipped with the best engineering talent and a staff of assistants to develop and supervise the standards and a clerical force to serve the roads, every road supporting the bureau would be furnished with blue prints and drawings to be used in building their freight and passenger equipment during the year. Equipment already in use would not automatically become obsolete and require discarding. The practice would rather be to exhaust the existing stock of supplies of the materials and to replace it with the material of the new standards. A central bureau of standards would be one of the most important steps in promoting efficiency and economy, not only in the supply service, but in railroad operations, that has been undertaken in the history of railroads.

J. M. Day, stores foreman of the Southern Pacific at West Oakland, while not advocating the establishment of a national bureau of standards, vigorously supports the principle of standardization in supply operations. A comparison of the cost of operation of various railroads, he says, would indicate that railroads which have developed and maintained definite standards of operating their purchasing and stores departments are experiencing decreasing stock investment and operating costs. The fact that standardization programs are entrusted to committees composed of some of the ablest men in the railway business and are being developed with the co-operation of engineers and designers of equipment, builders and manufacturers of material, should be sufficient guarantee that nothing radical or impracticable will result from the standardization work.



A Boston & Albany Snow Scene, Showing How Winter Enlarges the Problem of Taking Inventory

Boozing Tabooed

A paper on building a vocation in railway storekeeping, by C. E. Oeschger, chief clerk of the Chicago, Milwaukee, St. Paul & Pacific stores, Milwaukee, Wis., wants more stress laid upon the human side of the storekeeping work. Since the store helpers and stenographers in the stores today will be the storekeepers of tomorrow, they should be studied with that in view. The writer would judge employees on the basis of their relative efficiency, taking into consideration general per-

formance, knowledge of storekeeping, personal characteristics, adaptability, intelligence and executive ability. He strikes at the "drink" habit with the statement that when a man dissipates he not only saps the vitality that ought to go into his work but casts a reflection on the organization he represents. Storekeepers will take a big step forward, he writes, and elevate their vocation by standing for clean living and fair play.

Better Training Needed

The manpower question was emphasized by H. G. Streight, chief clerk to the general storekeeper of the Chicago Great Western at Oelwein, Ia. The store department, he writes, has invariably been to a certain extent hampered in the ability to obtain good men. Among the many things being done by the stores department at present, none is more important than the proper selection and training of employees, and in no other department is it more necessary that employees be educated. He would remind department heads that their accomplishments have been brought about through the assistance of their workers and their success depends on how their men are trained to achieve the results under their supervision. The complexities of the store department are many and familiarity with each of them is necessary to a successful organization. To reach his highest efficiency, the young man should be properly instructed by his superior.

H. F. Burnett, general foreman of the store department of the Kansas City Southern at Pittsburg, Kan., would have more attention paid to the selection of new employees in promoting the interests of the purchasing and stores department. Every man who comes into the organization, he writes, represents an investment on the part of the company in actual dollars and cents. For this reason, young men are to be preferred. They have greater possibilities for improvement than older men whose habits of thought and action have become fixed. The money invested in training them is better spent. Having been carefully selected, they should be instructed and trained thoroughly in their duties and encouraged to do good work. A premium system is recommended as a means of increasing the individual output.

Nothing short of a comprehensive system of text book instructions for purchasing and stores department employees is advocated by A. B. Moore, storekeeper of the Union Pacific, Portland, Ore., as a means of training the employees adequately for the work. A railroad company, he writes, has certain books of rules, bulletins, letters of instructions and standards, to be followed, also apprentice or manual training for mechanical department students, but standard books of instructions are not furnished employees to any extent. For the most part, the new and inexperienced employee obtains his knowledge of the work from older employees and from personal contact. This is especially true in the stores department. With the help of a text book containing the necessary available information, efficient employees could be produced at much less cost than by present methods, and the work will be done more efficiently and safely.

By making a careful study of methods used on some of the foremost railroads, standards could be developed and placed in the form of instructions which would give employees in various subdivisions of the work a thorough understanding of their work. Some of the largest and most successful concerns in the manufacturing and mercantile world have special training for their employees, and the subject of railroad stores and purchases could be made one of the most interesting as well as profitable courses of study. A text book or standard book of instructions should be divided into volumes prepared in loose leaf or pamphlet form so that each subdivision of the department could have a separate copy. Mr. Moore's book would include a volume on study for advancement from laborer to stores deliveryman, a second volume on study for advancement from stores deliveryman to helper, a volume on a study of advancement from helper, a volume on the section storekeeper, and additional volumes on forest products, on the care and operation of trucks and tractors, on the care and operation of locomotive and electric cranes, on scrap classification and sorting, on material reclamation, on purchases, contracts and inspection, on stationery and printing, on accounting instructions, on the duties and conduct required of employees, on safety rules and practices, on fire prevention, etc.

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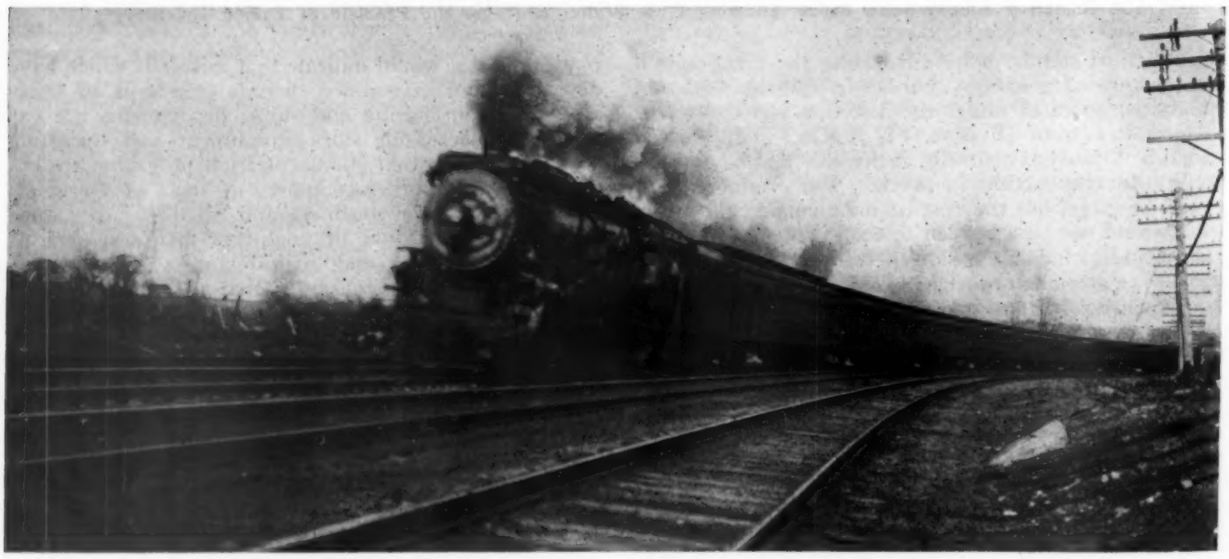
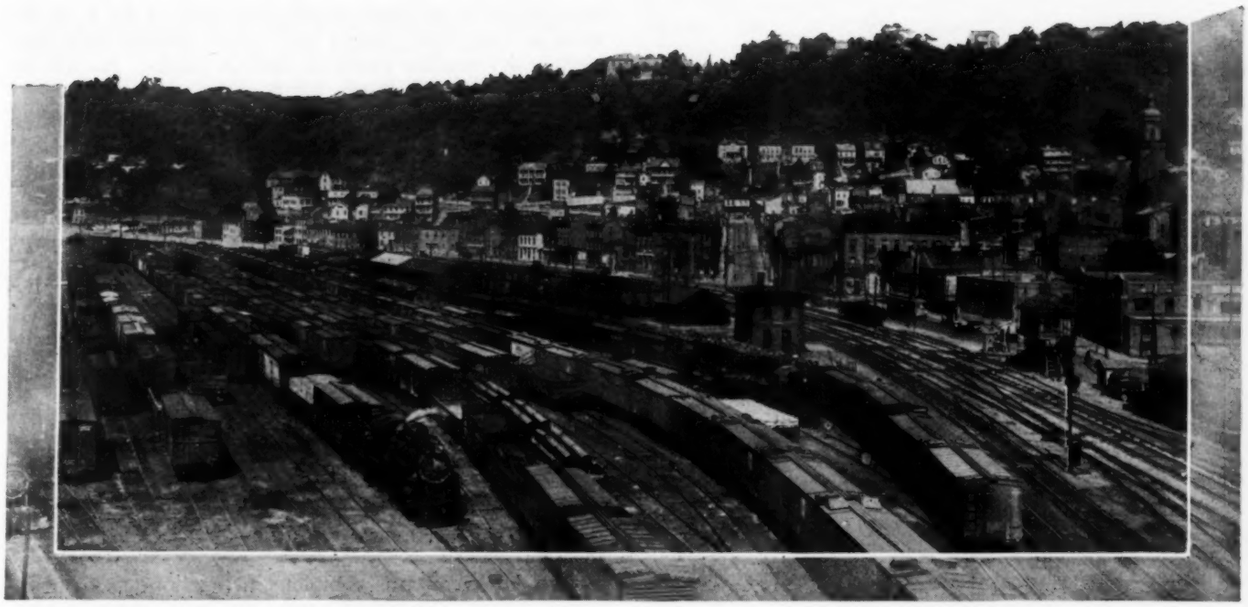


The New Haven's "Knickerbocker Limited," Westbound Near New London, Conn.



The Storrs Yard of the B. & O. at Cincinnati

Close Supervision Solves Terminal Problem

Baltimore & Ohio secures co-ordinated operation of scattered yards in Cincinnati

IN 1927, transfer trains in the Cincinnati terminal of the Baltimore & Ohio handled an average of 5.9 cars per engine hour, as compared with 7.5 cars in 1928. St. Louis division transfer trains handled 5.1 cars in 1927, and 5.9 in 1928, and Toledo division transfer trains handled 6.7 cars in 1927, and 9.2 cars in 1928.

The increase in efficient operation in a terminal where severe handicaps exist in the form of scattered facilities, is attributed largely to the fact that the terminal is operated in accordance with the information developed in the course of a thorough study of operating conditions. Another factor which has tended toward improvement is the supplying of daily operating and cost statistics, and the setting of a yearly goal for operating performance. The general plan, under which all terminals on the B. & O. are operated, was described in the *Railway Age* of September 7, and this article is supplementary thereto, in that it describes how the general plan works out when applied to an individual terminal.

The Cincinnati Terminal

For the purpose of illustrating how the general plan works out in a specific terminal, the Cincinnati terminal was selected, not merely because of the results obtained, but because the complexities of operation at that terminal rendered the working out of the plan most difficult there.

The Cincinnati terminal division of the B. & O. serves 360 industries. It consists of 63 miles of main and second main tracks and 57 miles of industrial tracks, of which 27 miles are owned by the railway and 30 miles by the industries. A large volume of traffic moves through this terminal. The details of the movement during 1928 are given in Table 1.

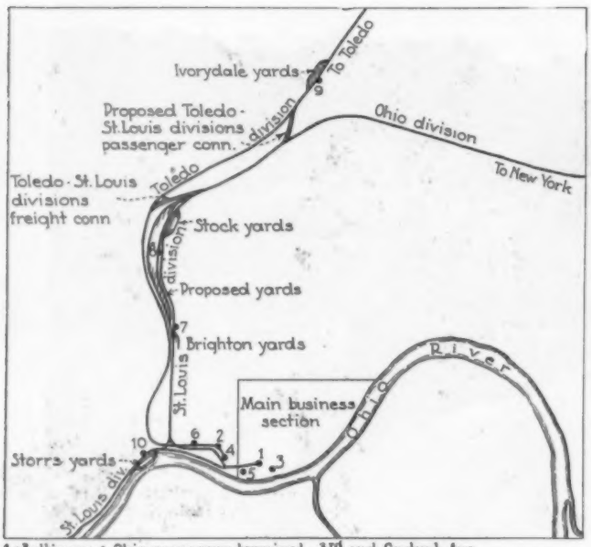
The largest single day's business was handled on May 12, 1927, when 36 trains, containing 868 loads and 1,235 empties, were received inbound, and 36 trains, with 1,409 loads and 518 empties, were dispatched outbound. On the same day, 1,358 loads and 368 empties were received from connections and 578 loads and 1,070 empties were delivered to connections.

Table 1. Traffic Handled in the Cincinnati Terminal of the Baltimore & Ohio, During 1928

Loads received from connections	267,327
Empties received from connections	69,375
Total received from connections	336,702
Trains outbound	11,521
Loads outbound	425,458
Empties outbound	153,659
Trains inbound	12,811
Loads inbound	366,253
Empties inbound	317,437
Cars unloaded at freight houses	33,330
Cars unloaded at team tracks	16,388
Cars unloaded at industries	84,732

Physical Handicaps

A glance at Fig. 1, which is a map of the Cincinnati terminals, will indicate some of the difficulties encoun-



1 - Baltimore & Ohio passenger terminal 3rd and Central Ave
2 - Kenyon Ave freight house 3 - Plum St team tracks
4 - Baltimore & Ohio passenger terminal 5th and Baymiller Sts
5 - Smith St station and ware house 6 - Yard No2 7 - Brighton yards
8 - Stock yards 9 - Ivorydale yards 10 - Storrs yards

Fig. 1. The Cincinnati Terminals of the B. & O.

tered. Cincinnati is an unusually hilly city, and the only possible entry for railways is through the few relatively narrow valleys between the hills.

The B. & O. line from St. Louis, for example enters the city from the West along the north bank of the Ohio river. The Newark and Ohio divisions run north through the Mill Creek Valley, a highly concentrated industrial district, turning eastward at Winton Place. The Toledo division parallels this line as far as Winton Place, continuing northward from that point through the industrial suburbs of Ivorydale, Elmwood and Lockland.

These were three separate railways originally, the St. Louis division having been the Ohio & Mississippi; the Toledo division, the Cincinnati, Hamilton & Dayton; and the Newark and Ohio divisions, the Baltimore & Ohio. Each line had its own yards, which were, of course, operated as separate units. The B. & O. still has no central classification yard in Cincinnati, although one will be built in the near future, but the various scattered yards originally built for three separate railways have been co-ordinated, so far as operation is concerned, to secure the maximum efficiency.

The principal yards of the three railways which now

Number of Run	Yard Location	Trick	Begin Work	Stop Work	Change Crews
No. 43	Stock Yards	First	7.30 AM	3.30 PM	On Pit 3.30 PM
No. 45	Stock Yards	Second	4.00 PM	12.00 Mid	On Pit 12.00 Mid
No. 49	Transfer	Single	6.45 AM	2.45 PM	Engine to Ash Pit
No. 31	Cedonsville and Transfer	Single	9.00 AM	5.00 PM	Engine to Ash Pit
No. 35	Oakley Industrial	Single	6.30 AM	2.30 PM	Engine to Ash Pit
No. 55	E. Norwood Winton Place	Single	7.00 AM	3.00 PM	Engine to Ash Pit

SPECIAL INSTRUCTIONS

Runs Nos. 43-45 - Classify Stock Yards. No. 43 handles Cincinnati Abattoir Work.

Run No. 49 - Handle Passenger Service Toledo Division to Central Union Depot and Merchandise for Room spotting Smith Street from Toledo Division and St. Louis Division Sides.

Run No. 31 - Handle delivery to Cincinnati Southern, L. & N. R.R. and C. & O. R. R. from Storrs and Stock Yards yard. Toledo [illegible] from Queen City Yard

Fig. 2. Assignment and Schedule of Yard Crews

make up the Cincinnati terminal division of the B. & O., were at Ivorydale, Storrs and Stock Yards, with supplementary smaller yards at various places. As will be seen from Fig. 1, these yards are widely scattered through the terminal area, involving long transfer runs in moving the cars from one yard to another.

Terminal Operations

The scattered location of the yards made this a particularly difficult terminal to which to apply the general yard plan. To secure efficient operation it was vital that there should be only a minimum number of transfer train movements between the various yards and that the operation of yard engines be planned daily with reference to the terminal as a whole, rather than the convenience of any one yard or enginehouse.

An exhaustive study was made of every operation within the terminal. Actual tests were made to determine the best method of operation for each individual run. When the proper operation of the terminal had been determined, the plan was incorporated in a 60-page book, known as the working book of the Cincinnati terminal.

This book contains complete instructions as to track classification, divisional and through classification, bridge transfer trains, industrial and team track switching, freight shed and transfer switching, repair track switching, terminal allowance for dispatchments and

Track No.	Track capacity	Cars in position in accordance with track classification	No. of cars	Cars out of position and not in accordance with track classification	No. of cars
1	45	Receive drags from East			
2	10	Heavy repairs spotted			
3	11	Heavy repairs spotted			
4	13	Light repairs spotted			
5	16	Light repairs spotted			
6	16	Light repairs spotted			
7	28	Receive from Toledo Divn.	Keep Clear		
8	40	Bank cars for weighing			
9	7	Cabooses - Way freight			
10	10	Steam Crane, Relief train			
11	31	Bank bad orders for spotting			
12	38	Wood Street Deliveries			
13	42	Louisville Sub-Division freight			
		[illegible] Division			

Fig. 3. Yardmasters' Classification and Turnover Report

the assignments and periods of the tours of duty of the crews. It outlines and governs the entire operation of the terminal and deviation is not permitted, except upon written permission from the chief of yard and terminal operations.

The assignment and schedule of yard crews covers 64 runs. It shows from what yard the run shall be operated, when the crews shall begin work and when they shall stop, where crews shall change, and the work to be handled. For example, runs 31, 33 and 35 operate from the Hopple Street yard, 31 being the first trick, 33 the second, and 35 the third. Crews are changed on the job and the engines are hostled at the lunch period. The general assignment is handling stock at Hopple street for the Stock Yards Company. In addition, run 31 handles Cumminsville industrial switching and run 35 performs private industry work at Hopple street. Similar instructions are given for each of the runs, as shown in the sample page reproduced herewith as Fig. 2.

An idea of the importance of this control of the operation of locomotives and crews may be gained from

Table 2, which shows the locomotive and crew assignment in the Cincinnati terminal for the year 1928.

A Place For Each Car

The proper track classification for each car is also given. Supervision is facilitated by a report rendered by each yardmaster, before going off duty, showing the number of cars in his yard in the proper position in

Table 2. Locomotive and Crew Assignment in the Cincinnati Terminal for 1928

	Ivorydale	Storrs	Stock Yards
Engines dispatched:			
Freight	13	3	22
Yard	33	36	20
Number of trains:			
Inbound freight	13	3	22
Outbound freight	13	3	22
Yard	33	40	25
Engineers assigned:			
Road	34	100	0
Yard	33	40	25
Firemen assigned:			
Road	34	100	0
Yard	33	40	25
Assigned Power:			
Freight	32	5	99
Yard	39	25	14

accordance with track classification as well as the number of cars out of position, and not in accordance with track classification.

Each track in each yard is numbered and its capacity is given, together with the use to which it is to be put. This requires the yardmaster to operate in accordance

Name of Firm	Tracks in Operation	Car Capacity	Firm Number	Classification
Interchange with Tol.Divn.	1	25	F- 1	Interchange
T.J.Corcoran Co.	1	10	F- 2	Industrial
Proctor & Gamble Co.	2	10	F- 3	Industrial
F.W.Drackett Co.	3	41	F- 4	Industrial
National Rubber & Spec. Co.	1	10	F- 5	Industrial
S.H.Weas	1	12	F- 6	Industrial
Kenton Baking Powder Co.	1	2	F- 7	Industrial
Kenton Baking Powder Co.	2	4	F- 8	Industrial
Wabash Storage	1	25	F- 9	Storage
Winton Place, Ohio				
Name of Firm	Tracks in Operation	Car Capacity	Firm Number	Classification
J.P.Dietz Co.	1	3	G- 1	Industrial
Cincinnati Car Co.	1	8	G- 2	Industrial
Cincinnati Traction Co.	2	11	G- 3	Industrial
Brunswick Balke Collander Co.	1	12	G- 4	Industrial
Mauser Stander Tank Co.	1	4	G- 5	Industrial
B.F.Goodrich Co.	2	26	G- 6	Industrial
S.H.Weas	2	8	G- 7	Industrial
Cinti.Traction Co.-Mitch.Av.Yd	2	15	G- 8	Industrial
Team Track	1	2	G- 9	Team Track
King Machine Tool Co.	1	1	G-10	Industrial
Cincinnati Soap Co.	1	2	G-11	Industrial
[illegible]	1			[illegible]trial

Fig. 4. Manner in Which Industrial and Team Tracks Are Listed

with the most efficient methods, and gives his superiors a daily check on the operation of his yard. Figure 3 shows how this classification is recorded.

Each freight station track, team track and industrial track is also listed, with the car capacity and the classification, as shown in Fig. 4. Any special instructions relating to the operation of such tracks are also shown.

The care that is taken to insure the proper movement of cars and locomotives in and through this terminal has amply justified itself in the elimination of time wastes, which are likely to be present in a terminal of this size unless it is supervised closely.

The Supervisory Organization

The terminal operations are under the supervision of a superintendent and an assistant superintendent. For operating purposes, the terminal is divided into two sections, one known as the Toledo side, the other as the St. Louis side. The former includes the terminal operations of the Toledo and Indianapolis divisions, the latter, those of the St. Louis, Newark and Ohio divisions. Each of these "sides" has a trainmaster in charge, with day and night assistant trainmasters. There are 12 yardmasters on the Toledo side and 14 on the St. Louis side. A complete divisional organization is also maintained in the other departments, there being a terminal master mechanic and a superintendent of shops, and a terminal division engineer.

One of the factors which has been of assistance in co-ordinating the operations of the various yards, is the familiarity of each yardmaster with the terminal as a whole. Each of the yardmasters has a relief day each month, and a relief yardmaster takes charge of each yard in turn. When a vacancy exists for a regular yardmaster, the relief yardmaster is promoted to the position, and takes over the duties with a full and practical knowledge of the problems of all the other yards in the terminal. Thus he is able to visualize the terminal as a whole.

Interchange Co-operation

In addition to co-ordinating its own activities, the operation of the terminal is aided by the co-operation existing among the terminal superintendents of all of the roads entering Cincinnati. Interchange presents a difficult problem in this terminal. For example, the transfer runs between the B. & O. and the Louisville & Nashville are made between Ivorydale, Ohio, and De Coursey, Ky., a distance of 16 miles, and between Ivorydale and Latonia, Ky., 12 miles. The transfer runs with the Chesapeake & Ohio are made between Ivorydale and Stephens, Ky., 16 miles.

Engines in these services are pooled, with the L. & N. in one case and the C. & O. in another. These arrangements are operated similarly, it being the endeavor to maintain the engine hours on an even basis as between the two roads involved. If one road should be short of power, the other road supplies more than its share of the locomotives for a day or a week, as the case may be, but this is invariably made up by the other road. This not only provides a greater flexibility of power on these runs, but also avoids changing engines in the congested districts immediately north of the Ohio river bridges, where the B. & O. tracks meet those of the C. & O. and the L. & N. This co-operation is carried out further in that the B. & O. pre-classifies all cars for the L. & N., separating the Kentucky division cars from the Louisville division cars. In return, the L. & N. separates the east and northbound cars for the B. & O., and the terminal operation for both roads is materially simplified.

The "maintracker" system in effect on the B. & O. also aids the Cincinnati terminal operations, in that it permits running a certain number of trains through without classification and renders the switching on other trains less heavy. These trains are brought in to one of the yards by a road engine and taken out almost at once by another road engine, thus avoiding the running of transfer trains from one yard to another within the terminal. Similar pre-classification is made at eastern terminals for trains moving through Cincinnati to the West.

THE MISSOURI TAX COMMISSION, in its annual report to the State Board of equalization, has recommended that the public utilities operating in the state, except gas, water and steam-heating companies and certain properties assessed locally, be assessed for taxation on a basis of $498,563,140 which is an increase of $12,443,653 over the taxation valuation fixed by the Board in 1928. The 60 steam railroads in the state are valued at $285,271,529, an increase of $15,773.

Equipment Painters Meet at Kansas City

APPROXIMATELY 320 members, guests and railway supply men had registered before the opening session of the eighth annual meeting of the Equipment Painting Section, American Railway Association, held September 10, 11 and 12, 1929, at the Muehlebach Hotel, Kansas City, Mo. This year's meeting also marks the fifty-ninth anniversary of the organizing of the former Master Car and Locomotive Painters' Association which was founded at Boston, Mass., in 1870. The first day's session was called to order by Chairman D. C. Sherwood, foreman painter of the New York Central, and an address of welcome was made by Mayor Albert I. Beach of Kansas City. Mayor Beach's address of welcome differed somewhat from the conventional form in that he did not bring along the key to the city for presentation to the convention, but stated that in Kansas City no key was needed —just walk in. He offered no glowing reasons why the city was the greatest in the country, but remarked that inasmuch as Missouri originated the "show me" idea, he felt that it was up to Kansas City to prove its real merits.

Safety a By-Product of Efficient Management

One of the principal addresses during the convention was that at the opening session by E. R. Cott, supervisor of safety, Hocking Valley, and past chairman of the Railroad Section of the National Safety Council. Mr. Cott in his remarks drove home the point that safety in railroad work is a by-product of efficient management and the by-product of the right mental attitude on the part of officers and supervisors. He said that it was not necessary to ask what kind of a foreman a man was if one could only get a chance to look at the condition of his shop—that tells the story. One of the most important requisites in the elimination of accidents is the desire on the part of the supervisor to eliminate the conditions which foster accidents.

Mr. Cott expressed very clearly the real opportunities and duties of a foreman when he said that a foreman's privilege is to select, educate and train men and that his greatest opportunity is to become a leader of men and that the supervisor who takes this attitude towards his job usually does become a real leader and a "safe" leader. During his remarks he placed somewhat of a new interpretation upon the word "supervision" by suggesting that it could readily mean a great deal more by spelling it "Super Vision," the definition of which would be "to see more." He used this as an illustration to point out that one of the requisites of a real leader of men is the ability to see more than the other fellow and thereby be able to see the whole job at a glance. Such a man, Mr. Cott pointed out, has the ability to foresee the things in a shop and in its facilities that will prevent men from being the victims of costly accidents.

Why Lacquer Was Developed

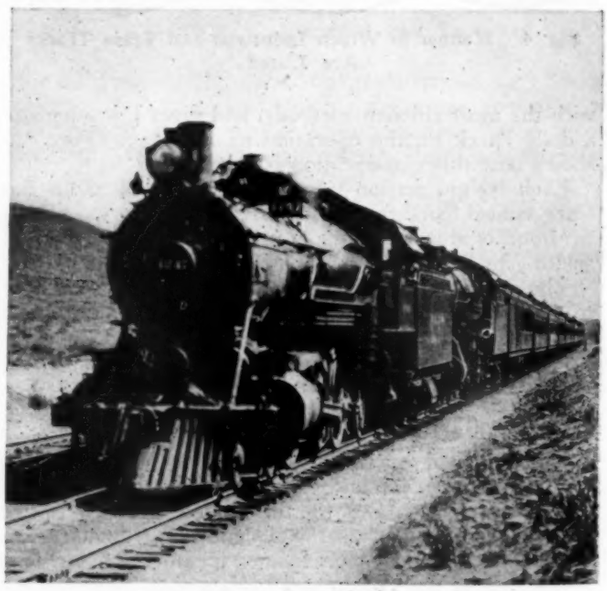
An individual paper was presented during the first day's session by William J. Miskella, M. E., director of the Finishing Research Laboratories, Inc., on "The Value of Research to a Railway Paint Shop." Mr. Miskella's paper opened with the statement that mass production is the keynote of the present day and that it has taken the place of the oldtime secret processes and under-cover work. Mass production, he declared, has carried us out of the patent medicine era into the business consolidation age. Among other things he said:

"The fact that you are assembled here to exchange ideas openly and to do all that you can to help each other is the best argument in the world that the new order of things is the better one. Your work is out of the secret class, but is not quite in the mass-production class. It is better to be looking forward than backward, and so we will imagine that each one of you will be directed by your superior officer when you get back home to prepare to increase production to 30 cars a day without increasing your floor space."

Mr. Miskella then illustrated the things that would have to be done to bring about these conditions and the kind of equipment that would be necessary. Into his talk he injected a picture of the important part that scientific research work would play and has played in increasing production in the paint shop. During his talk Mr. Miskella gave the very interesting story of how lacquer came to be introduced into the automotive field and later in the railway field. He told how about seven years ago C. F. Kettering, director of General Motors Research Laboratories, called a large conference of paint manufacturers and told them that something had to be done to reduce the then existing time of about four weeks to finish an automobile. The manufacturers came back with samples and a process that would reduce the time to three weeks, but were told that that would not do and that the time would have to be more like three days. The story of how Mr. Kettering forced the issue and later caused the Oakland automobile plant to be used as a test outlet for lacquer finished cars is common knowledge and shows what research will do to cut costs, improve quality and increase production.

In addition to the above an individual paper was presented by H. W. Ostrum of the Aluminum Company of America on the subject of the use of "Aluminum Paint in the Transportation Industry." Committee reports were also presented during the sessions on shop construction and equipment, maintenance and care of paint and varnish at terminals, ornamentation of cars and locomotives, equipment painting practices and new developments in equipment painting and economies involved.

* * *



The Union Pacific's "Los Angeles Limited," Near Barstow, Cal.

B. & O. Builds Two Lounge Cars

For service on the "Columbian" trains between Washington, D. C., and New York City

TWO club lounge cars containing a number of unique features in interior decoration and arrangement were recently completed at the Mt. Clare, Md., shops of the Baltimore & Ohio for the service of Pullman car passengers on its new "Columbian" trains now operating between Washington, D. C., and New York. In many respects these coaches represent a new type of passenger equipment. They are divided into two compartments, a lounging and a general smoking room, both of which are available to ladies and gentlemen. The lounge compartment is furnished and finished in the manner of a home-like living room or drawing room, with a convertible settee, deep-cushion arm chairs, library table and writing desk. The smoking compartment, which is separated from the lounge room by a glass partition and swinging door, is a club-room, with furniture of similar style to the lounge room.

The length over the end sills is 70 ft. The lounge room is 33 ft. 4¼ in. long and seats 29 passengers,

The Lounge Is Furnished and Decorated to Present a Home-Like Effect

The Club Smoking Room

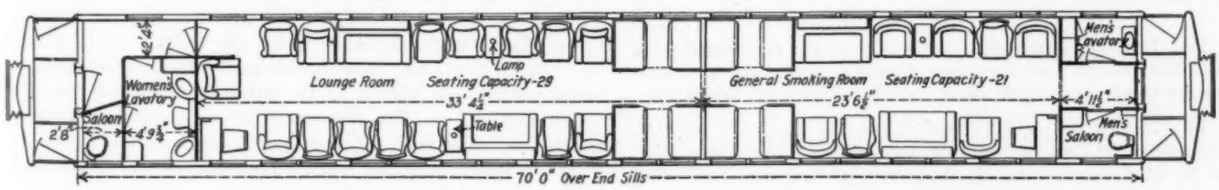
while the general smoking room is 23 ft. 6½ in. long and has seats for 21. The total seating capacity of the cars is 50, which compares favorably with that of the customary club car.

The women's lavatory is located at the lounge-room end of the car and is provided with two wash basins. A shelf placed between the two wash basins, with a large mirror directly above, serves as a dressing table. The women's toilet is located in an adjacent compartment, the door of which opens into the women's lavatory. The men's lavatory and toilet are also located in commodious compartments at the smoking-room end of the car. The lavatory, which is located across the aisle from the toilet, contains the porter's locker, and lockers for the switchboard, heat regulator, etc. No equipment, such as air brake valves, lockers, etc., are located in the women's lavatory compartment. One corner of the women's lavatory is occupied by a table locker, the door of which opens into the hallway as shown in the accompanying drawing.

Interior Finish

These two cars are of steel construction with the interiors finished in natural mahogany. The upper deck is of the square type, equipped with the conventional deck sash ventilation. The ceiling and sides of the deck are finished in ivory color. The lower deck is panelled mahogany finished in the same color as the side walls.

The windows are equipped with double brass sash with suitable fixtures and with large metal frame screens which are arranged to be raised or lowered. The win-



Floor Plan of the Two Club-Lounge Cars Now Operating on the Baltimore & Ohio's "Columbian" Train

The Wall Fixtures are of Special Design with Mica Shades Showing the "York" Hauling Two Coaches in Black Silhouette

dow curtains are of pantasote with a silk facing, in a blue rose pattern. The cars are equipped with special center deck electric-light fixtures with shades designed to provide an agreeable and pleasing diffusion of light. Each of the cars is equipped with special wall fixtures, which are shown in one of the illustrations, having two arm lights with mica shades decorated with a silhouette of the "York" hauling two passenger cars of that time. Students of railroad history will remember that the "York," which was built by Phineas Davis, won the prize of $4,000 offered by the B. & O. in 1831 for the best locomotive. The table lamps also have mica shades, the panels of which are decorated with scenes of historical interest located on the lines of the Baltimore & Ohio.

The furniture consists of settees, chairs of the overstuffed type with reversible cushions and arm chairs with upholstered seats and backs. Two sections of the Rathskeller type are located at the end of each compartment near the center of the car. These sections are provided with card-table facilities and have a seating capacity for 16 people. The furniture in the lounge room is upholstered in velour, mohair and plush, some of the plain and others of the figured type. The furniture in the general smoking room is upholstered in brown leather. The tables are of mahogany, built with book or magazine racks underneath. The entire floor of both compartments is covered with carpet laid over a soft blanket to soften the tread of the occupants. The pattern and shade of the carpet harmonizes with the general blue and ivory color scheme used throughout the cars.

Both cars are equipped with air pressure water systems, cast steel trucks, having clasp brakes and forged steel wheels. They are equipped with wide Pullman type enclosed vestibules, and have a length over the buffer plates of 79 ft. 10½ in.

THE LIVEOAK, PERRY & GULF RAILROAD has contracted with the Metropolitan Life Insurance Company for group insurance for its employees; total amount of life insurance $85,000.

THE GRAND TRUNK WESTERN (Canadian National), in 1928, transported 211,264 carloads of automobiles, which is claimed to be 12,375 more carloads than were moved over any other railroad.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT car loading in the week ended August 31 was again the highest for any corresponding week on record. The total was 1,160,210 cars, an increase of 43,499 cars as compared with the loading in the last week of August last year and an increase of 42,850 cars as compared with 1927. All districts except the Central Western reported increases as compared with 1928 and all except the Southern showed increases as compared with 1927. Loading of ore, miscellaneous freight, coal, forest products and coke was larger than in the corresponding weeks of both previous years, while merchandise showed an increase as compared with 1928 but a decrease as compared with 1927. Loading of grain and livestock was less than in either previous year. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, August 31, 1929

Districts	1929	1928	1927
Eastern	262,443	256,421	249,771
Allegheny	239,500	225,502	225,127
Pocahontas	65,748	58,304	64,616
Southern	152,571	145,449	160,672
Northwestern	183,242	174,422	175,436
Central Western	165,000	169,406	156,649
Southwestern	91,706	87,207	85,089
Total West. Dists.	439,948	431,035	417,174
Total All Roads	1,160,210	1,116,711	1,117,360
Commodities			
Grain and Grain Products	53,409	57,314	60,547
Live Stock	26,817	27,690	30,058
Coal	192,906	178,089	190,639
Coke	11,696	9,827	10,133
Forest Products	69,778	66,889	69,459
Ore	75,237	68,610	61,633
Mdse. L. C. L.	266,636	263,436	267,275
Miscellaneous	463,731	444,856	427,616
August 31,	1,160,210	1,116,711	1,117,360
August 24,	1,135,567	1,080,698	1,109,341
August 17,	1,100,267	1,057,909	1,066,828
August 10,	1,090,616	1,044,268	1,049,639
August 3,	1,104,193	1,048,821	1,024,038
Cumulative totals, 35 weeks	35,341,011	33,754,221	34,802,007

The freight car surplus for the period ended August 23 averaged 173,554 cars, including 47,121 coal cars, 87,492 box cars, 22,275 stock cars and 11,708 refrigerator cars.

Car-Loading in Canada

Revenue car loading at stations in Canada for the week ended August 31 totalled 77,557 cars, an increase over the previous week of 7,651 cars and an increase over the same week last year of 3,882 cars.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
August 31, 1929	77,557	39,048
August 24, 1929	69,906	37,875
August 17, 1929	69,942	37,275
September 1, 1928	73,675	41,037
Cumulative Totals for Canada		
August 31, 1929	2,337,737	1,444,097
September 1, 1928	2,279,980	1,365,502
September 3, 1927	2,133,227	1,319,492

THE UNITED STATES CIRCUIT COURT OF APPEALS at St. Louis, Mo., on September 7 affirmed the decision of a lower court in dismissing an injunction suit brought by the Brotherhood of Railway Trainmen who sought to compel the Wabash Railway to establish a 22-ft. clearance under the Delmar viaduct over its tracks at St. Louis. The application of the brotherhood was based upon a law passed by the Missouri legislature in 1925 which required a 22-ft. clearance for viaducts over railway tracks but authorized the state public service commission to permit a lesser clearance when circumstances warranted such construction.

Car Officers Hold Their First Annual Convention

Newly-organized M. C. B. & S. Association hears addresses by T. W. Demarest and Dr. Samuel Stevens

A YEAR ago at St. Louis, Mo., two bodies of railway car department officers united to form a single national organization known as the "Master Car Builders' and Supervisors' Association." After a year of constructive work under the leadership of President S. O. Taylor, master car builder of the Missouri Pacific, this association convened for its first annual convention at the Hotel Sherman, Chicago, September 4 to 6, inclusive. An active membership committee, headed by K. F. Nystrom, superintendent of the car department of the Chicago, Milwaukee, St. Paul & Pacific, has succeeded in building up the membership to 1,600, a substantial proportion of which was present at the convention. Two high points of the excellent program, prepared by the program committee, with C. J. Wymer, superintendent of the car department of the Chicago & Eastern Illinois, as chairman, included addresses by T. W. Demarest, superintendent of motive power of the Pennsylvania, Western Region, and Dr. Samuel Stevens, professor of psychology at Northwestern University.

An abstract of Mr. Demarest's remarks is included in this article. Dr. Stevens discussed the general subject, "Psychological Aspects of Handling Men," giving his remarks such an intensely practical turn that he held the closest interest of his audience throughout. Other individual papers and reports presented during the course of the convention are shown in the complete program published on page 355 of the *Railway Age* issue of August 3.

Election of Officers

At the concluding session of the convention the following officers were unanimously elected to guide the association in its activities during the coming year: President, C. J. Wymer, superintendent car department, Chicago & Eastern Illinois, Danville, Ill.; first vice-president, K. F. Nystrom, superintendent car department, Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wis.; second vice-president, F. A. Starr, supervisor reclamation, Chesapeake & Ohio, Richmond, Va.; third vice-president, L. R. Christy, master car builder, Gulf Coast Lines, Houston, Tex.; fourth vice-president, E. J. Robertson, superintendent car department, Minneapolis, St. Paul & Sault Ste. Marie, Minneapolis, Minn.; and secretary-treasurer, A. S. Sternberg, master car builder, Belt Railway of Chicago. The board of directors, as newly elected, consists of the following: Chairman S. O. Taylor, master car builder, Missouri Pacific, St. Louis, Mo.; F. H. Becherer, superintendent car department, Central Railroad of New Jersey, Jersey City, N. J.; R. J. Overton, general foreman car repairs, Southern, Spencer, N. C.; D. E. Bell, A. R. A. instructor, Canadian National, Winnipeg, Man., Can.; and A. J. Krueger, master car builder, New York, Chicago & St. Louis, Cleveland, Ohio.

Freight Equipment Needs

By T. W. Demarest

Superintendent Motive Power, Pennsylvania, Western Region

The more I come in contact with operating costs and net returns, the more I am convinced that nothing is worth while, neither subjects, investigations nor appliances, unless the results will produce net revenue to our stockholders. While I have been to a great extent all of my life a "locomotive man," I have had,

through force of circumstances and perhaps some inclination, to pay more than a considerable amount of attention to the cars, particularly the freight cars.

I am going to talk to you this morning, therefore, on some of the developments in freight-car construction and maintenance which seem to me, if followed up consistently by all of us, cannot help but increase the service time of the car, decrease its visits to the car repair tracks, and reduce the maintenance costs per mile. Some of you, perhaps, were fortunate enough to be able to attend the last meeting of the Mechanical division, American Railroad Association, at Los Angeles, Cal. I regret you were not all able to be there. There were two outstanding developments at that meeting—one, the report of the Committee on Friction Draft Gears; the other, the final adoption by the Division of the principle that, in future construction and replacements, cast-steel truck side frames will be used. The division from year to year has gradually defined contion and strength requirements, effective as yet principally to truck and underframe construction. In spite of the adoption of a minimum sectional area of center sills and the Type D coupler, owing to increased car capacities, increased length and weight of trains, increased speeds, and the natural stress under which the entire movement is taking place, we were gradually getting back, in so far as center-sill damage was concerned, to our previous situation. We had forgotten, for the time being, that there was another element in the combination that would have to progress concurrently, and that was the friction draft gear. The committee report was a most timely one and for the first time presented to all of us the relative strength and weaknesses of the various types of gears, and indicated to all of us, the railroad user as well as the manufacturer, the lines along which we shall have to work to bring this detail up to the point that, instead of the car protecting it, it will protect the car and in so doing, protect itself.

The Cast Steel Side Frame

The adoption of the cast-steel side frames for trucks is one of the biggest advances made by the association, and to me ranks, in what it will accomplish, with the adoption of the air brake and the automatic coupler, and while the action of the division was not entirely complete, it being permissive under certain conditions to use the older types of cast-steel frames, it is only a question of time until no side frame will be countenanced unless it conforms to A. R. A. standards at the time it is applied.

Aside from the question of increased safety, I wonder if the full significance of the action strikes you. It means decreased labor and time in inspection, in interchange, in transportation yards, and in repairs on freight-car repair tracks. You will begin to obtain these advantages from the moment you begin to apply them. It will reduce truck maintenance to wheel and axle work, and as these details must be continuously maintained, it provides, in effect, for a truck that never wears out. On freight-car replacements, it provides a truck which may continuously be reapplied to new car bodies, reducing the cost of replacement to practically that of the new body; as couplers, draft gears and the major portion of the air brake should also be recoverable. It is incomprehensible to me, with all of these advantages in sight, that the application is not generally proceeding at a more rapid rate.

The journal bearing in the truck construction and the hot box, train delays, set-off cars and maintenance expense, is still a nut to crack. The answer is fairly clear, i. e., eventually, perhaps, the roller bearing, but until the capital charge for application is materially reduced, and until a common standard of axle and box installation can be adopted, its use seems prohibitive in freight service.

And this brings us to the largest unsettled question in freight-car construction and maintenance, and that is, the body of the car, the material of which it is made, its type of construction and the type and construction of details applied to it—side doors, roofs, and, if you so please, ends. While the Committee on Car Construction has made a notable advance and roads are gradually adopting the standard cars as they are developed, there are too many variations being placed up to the committee, based on presumed traffic differences and requirements on different roads, forgetting entirely that cars today are in universal service. There seems to be only one way to control the situation and that is for those who control the activities of the A. R. A. to put their foot down and agree on a policy which will be followed by all member roads.

There are still a great number of cars in the country with wood bodies; some of them may have steel frames and some also have steel ends. Lumber is becoming more difficult to get, the quality is depreciating, and dry lumber is out of the question. Even if good lumber could be placed in a car it is too hard to hold when it swells and cracks develop when it shrinks. The weight variations of a wooden car are continuous. We have all seen, in the past few years, a change in the traffic, a change which requires a better car, one which the shippers are demanding and to which they are entitled. There is only one answer and that is an all-metal body.

Now, don't say it costs more; don't say it costs more to maintain; and don't say its life is shorter. The facts are against you. If you do your part, with proper design, corrosion due to moisture leakage, can be kept from the concealed parts of the car. If you owned a house, you would not let it go, year in and year out, without painting, and if you would pay as much attention to steel cars—I am referring to house cars now—the bodies, barring wrecks, should last indefinitely. The current maintenance, under ordinary handling, should be reduced to floor and lining repairs, repainting, and wheel and axle work.

I am also firmly convinced that in so far as the economy of freight-car construction and maintenance are concerned, there should be no proprietary details or devices; that such items should be standardized, be the property of the A. R. A., and free to the member lines at a manufacturer's profit only.

If we know how to maintain a freight car, and sometimes I think we don't, we are too slow in putting the proper methods into effect. Insofar as heavy repairs are concerned, we have made tremendous advances. We have established shops where the work is processed and comes through in the minimum time and at a minimum expense and is turned out as a new car.

Our light-repair operations are another story. We are still largely content to do the work only for which the car was shopped and not endeavor to do all of the work which should be done on the car to make it entirely fit. While this result cannot be accomplished at once, as it apparently slows up the output of the repair track, it is a situation ahead of all of us for gradual development, and whether we do much or little it should be done right and done to last.

And, in connection with this development must come

the periodical shopping of cars for reconditioning. Whether this should be on a three-year basis, more or less, I will not attempt to say, but I know the practice is bound to come and I know when it does, the various light repair tracks will be devoted to correcting shifted loads and making accident repairs. The number and condition of the cars in service will most notably improve, and the cost of freight-car maintenance will show the same notable decrease that has accrued in the cost of maintaining locomotives, based on the adoption of similiar principles.

Don't get the idea in your minds that I think we will get to the place where there will be nothing for us to do. Far from it. We have some problems confronting us that are in our control and some not so readily solvable: improper methods of loading, to start with; materials which, even when loaded according to the loading rules, are most difficult to hold—creosoted poles and light sheet plates, for instance—and furthermore, our individual responsibilities in obtaining better handling in our transportation yards and on the road, to reduce not only car damage but delays to shipments and loss and damage claims. Regarding hot boxes and cut journals, I hope to see the day when, instead of an annual repacking, we will be repacking on a six-months basis, and we will not be figuring in terms of what it costs to carry out this program properly, but in terms of transportation money saved and maintenance money saved.

Features we still have to solve in maintenance costs are the damage done to the interior of house cars, to floor and lining on account of nailing blocks or other methods of securing shipments; the misuse of first class cars by loading them with materials which ruin the car for high class shipments; and the damage to open-top cars when unloading them under adverse weather conditions by building fires under them, and even in some cases, loosening up the contents with an explosive.

Don't you gentlemen think for one moment there are not live constructive matters in front of you in connection with freight car design and maintenance, in connection with solving of which you can all have a part, and as they are solved, they will result in fewer total cars, more serviceable cars, and a lessened expense to your respective roads.

(Mr. Demarest closed his address with some highly pertinent remarks regarding the interchange rules, maintaining that in requesting revisions, the chief interchange inspectors themselves cannot always agree on what changes will be helpful. He deplored the action of some local associations in practically abrogating certain vital interchange rules almost as soon as issued and said that this might lead to the taking over the entire interchange function by the A. R. A.—EDITOR.)

Are Your Track Scales Correct?

U. S. Bureau of Standards has installed master scale at Chicago where test weight cars can be calibrated

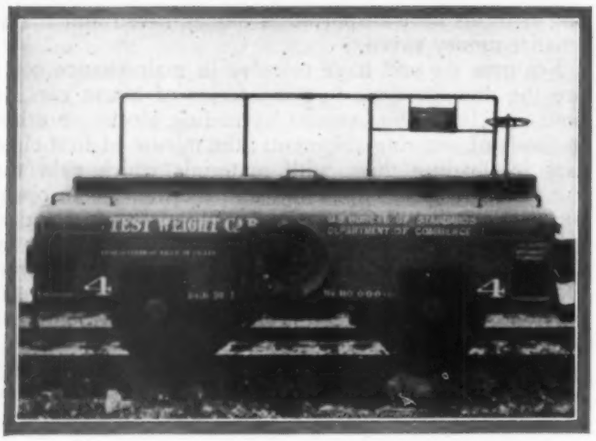
WITH the installation of a master scale at the Clearing yard of the Belt Railway of Chicago by the United States Bureau of Standards, the railways of a large part of the country are afforded the opportunity of having their test-weight cars calibrated at frequent intervals, thereby permitting them to check their track scales by test-weight cars which have been brought to a common standard of weight under the auspices of a neutral agency, whose only concern is accuracy.

The importance of correct weighing is universally recognized in the transportation field, and the railways, through the American Railway Association, have paid more and more attention to this matter in recent years. Since freight charges are almost invariably based on weight and since the railways are charged with the responsibility of delivering to the consignee the same apparent weight of goods accepted from the consignor, incorrect scales affect not only the revenues of the railways, but also their expenditures, by reason of the settlement of claims for supposed losses of commodities in transit, when no losses have occurred in fact. The magnitude of the quantities involved is seen by the fact that in 1927 the Class I railways hauled 2,363,639,000 tons of revenue freight.

The Master Scale is Housed in a Substantial Brick Building

That the railways have been concerned with the accuracy of their weights is evidenced by the following list of recognized master scales installed by carriers and others in various parts of the country:

Railway Owned	Location
Atchison, Topeka & Santa Fe	Topeka, Kan.
Atlantic Coast Line	Jacksonville, Fla.
Baltimore & Ohio	Martinsburg, W. Va.
Chicago, Burlington & Quincy	Havelock, Neb.
Illinois Central	Centralia, Ill.
Missouri Pacific	Sedalia, Mo.
Norfolk & Western	Roanoke, Va.
Oregon Short Line	Salt Lake City, Utah
Pennsylvania	Altoona, Pa., Alliance, Ohio and Columbus
Reading	Reading, Pa.
Southern	Charlotte, N. C., and Chattanooga, Tenn.
Southern Pacific	Oakland, Cal.
Union Pacific	Denver, Col.
Owned by Others	
Carnegie Steel Company	Braddock, Pa.
Minnesota Railroad and Warehouse Commission	Minnesota Transfer, Minn.
Oregon Public Service Commission	Portland, Ore.
Winslow Scale Works	Terre Haute, Ind.



One of the Bureau of Standards' Test Weight Cars

While this list might appear small for the total of more than 250,000 miles of railway in the United States, the master scales shown therein serve more than the mileage of the owning roads, since most of them may be used by other roads upon the payment of small fees, and their geographical locations permit their utilization by roads which do not maintain master scales of their own.

With these master scales owned by the various railways and others, it is essential that they be calibrated to show correct weights, for unless they are so calibrated the scales on any one road may be brought to show consistent results which still may not correspond with the weights shown by scales on another road. It is here that the Bureau of Standards functions by calibrating these master scales so that they may be brought into accord with one standard.

The dominating factor in the selection of the site for this master scale was maximum accessibility for the railways of the country, while a secondary, but nevertheless important, factor was the desirability of a location which is conducive to effectiveness and economy in the administration of the Bureau of Standards' master scale and track scale testing program. The location of the Clearing yard at Chicago fulfills both these requirements, since railways with more than 40 per cent of the total mileage of the country operate their own freight trains into Chicago, while the Belt Railway, a terminal and switching road, has connections with all of these carriers and can transport their cars to Clearing with a minimum of time, formality and expense.

The Bureau of Standards work is not confined to the maintenance and operation of the master scale, but includes the maintenance and operation of two test-weight cars of ordinary design which travel over the middle west and south for the purpose of testing the various scales in those territories. A test-weight car of special design for testing master scales is also operated. This car, which consists of a heavy steel frame carried on four wheels, is transported in a box car with end doors and fitted with a hoist and trolley for loading and unloading the car and the standard weights which are carried with it. These weights are in units of 10,000 lb., and by placing these on the deck of the car a total weight of 80,000 lb. can be obtained on the car. Each master scale is tested and adjusted within a tolerance of approximately 0.01 per cent. Similar cars are also operated by the Bureau of Standards from an eastern base to serve the eastern and southeastern portion of the country.

In addition to the calibration of test weights for railways, the station at Clearing does similar work for such commercial concerns as are interested in correct weights, especially those whose products are sold on the basis of weight. It also tests new designs of scales and for this purpose is provided with balances for the calibration of small weights as well as large ones, in order to serve as a laboratory for carrying on this work.

During 1928, test-weight cars to the number of 55 were calibrated at Clearing. Some of the larger systems send their cars at regular intervals of three months, while other roads do so at somewhat longer intervals. It has been found that these cars will vary in weight during the period between calibrations, even if they have not been in service in the meantime, owing to the collection of dust and the deterioration of the paint.

The master scale at Chicago, which is of the plate-fulcrum type, was built by Fairbanks, Morse & Co., Chicago, and has a capacity of 150,000 lb., being similar in design and construction to the master scale installed by the Pennsylvania at Altoona, Pa., a description of which was published on page 136 of the July 23, 1927 issue of the *Railway Age*. The scale is housed in a brick building, with inside dimensions of 42 ft. by 85 ft., and, in addition to the scale and beam cabinet, contains an office in one corner, together with machines and tools for the calibration and repair of the field standards. The track on which the scale is located runs entirely through the building, while another track extends into the building for the receipt and shipment of test weights and repair material.

The roof, of tile construction, is carried on girders and purlins, permitting the operation of a ten-ton traveling crane for handling heavy test weights or other loads, the crane, as well as the machines used for repairs, being operated by electricity obtained from a nearby power line serving the yard.

The master scale and related activities of the Bureau of Standards at Clearing are under the charge of H. M. Reeser, engineer-physicist, to whom we are indebted for the information on which this article was based.

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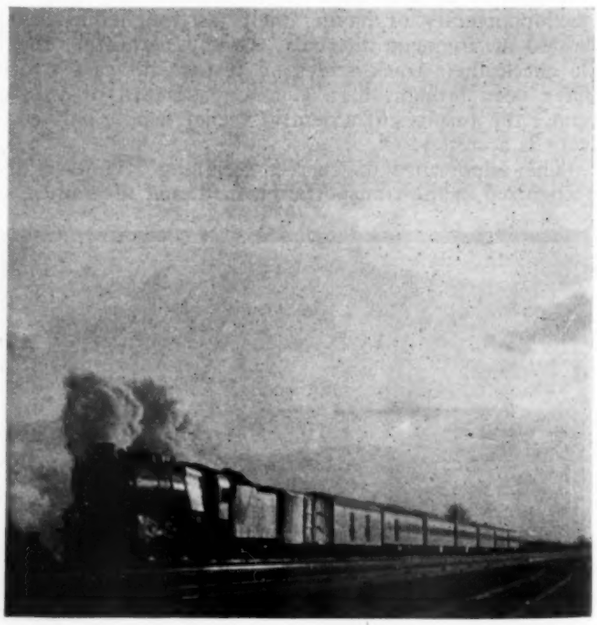


On the Pennsylvania, Near Trenton, N. J.

Freight Revenues and Values

I. C. C. Bureau of Statistics finds freight revenue 7.08 per cent of value per ton

WASHINGTON, D. C.

SUBJECT to some qualifications, the Bureau of Statistics of the Interstate Commerce Commission has calculated that the average freight revenue per ton received by Class I railways in 1928, $3.76, was 7.08 per cent of the average value per ton of the freight at destination, which was $53.08. The commission has made public a report from its director of statistics, Dr. M. O. Lorenz, Statement No. 29,111 showing for each of the freight commodity classes for which statistics are reported by Class I steam railways, the revenue received by the railways in comparison with the market value of the commodities. The freight revenue is that reported for the calendar year 1928, the first year for which complete information of this kind is available. The value of the commodities is based on wholesale prices obtained from various sources and relating as nearly as practicable to the close of the year 1928. Where a commodity class contains two or more articles, an unweighted average or estimate had to be used. Where the price used referred to point of production, the average freight revenue per ton for the class was added so that values at destination might be uniformly obtained. The price per ton was multiplied by the number of tons reported by the railways as originated in each class to get the total value of commodities in the class.

"It is obvious," the report says, "that such a total is exaggerated to the extent that there is duplication in the reports of tons originated. Such duplication occurs when traffic is reshipped on new bills of lading. For this reason, also, the average freight revenue per ton is understated, if one has in mind the aggregate revenue paid by a ton from farm or mine to the ultimate point of consumption or export. Thus, the average freight revenue per ton of wheat is shown as $4.36, or 21.8 cents per hundred pounds. This represents one average movement, and more than one such movement is probably necessary to get the average ton to a port or flour mill.

"As shown by a footnote in the table, the average freight revenue per ton is uncorrected for length of haul, or for any other condition. The fact that one class shows a higher freight revenue per ton than the average for another class, or for all classes, does not necessarily indicate that the freight rates are out of line. The variation may result from a difference in length of haul or from a difference in other conditions of transportation. Thus, Class 590, Passenger Automobiles, shows an average freight revenue per ton of $35.45. In this case, we have the combination of a long haul, a light load per car, and a high value per ton. The freight revenue for this class is 4.21 per cent of its estimated value.

"Load per car and length of haul relate to the cost of the service performed. If we are interested simply in what the traffic will bear, the haul and load need not be considered. From the standpoint of what the traffic will bear, it is the total freight burden per ton from producer to consumer that is of importance. The last column in the table, showing the per cent, which the freight revenue is of the value at destination thus has significance only with respect to one of the elements usually considered in rate-making.

"It is obvious that the freight burden is not generally adjusted in proportion to commodity values. Of the values at destination, the freight paid represents a much larger element in some cases than in others. Freight charges are a large factor in the destination prices of bituminous coal, gravel and sand, stone, cement, brick, lime, ice, hay, straw, and fresh fruits and vegetables, but are a relatively small factor in the prices of wool, leather, tobacco, cloth, and automobiles. The average percentage for all commodities is 7.08."

As bearing on the question of whether there could be any considerable shifting of the freight burden from the low grade to the high grade commodities, the statement includes the accompanying summary of the carload commodity classes.

Four group I, Products of Agriculture, the average freight revenue per ton was $6.26, or 10.01 per cent of the average value per ton at destination, $62.48. For Group II, Animals and Products, the freight revenue was $9.47, or 2.93 per cent of the average value, $323.52. For Group III, Products of Mines, the freight revenue per ton, $1.91, was 21.30 per cent of the average value, $8.98. For Group IV, Products of Forests, the freight revenue was $3.75, or 12.96 per cent of the average value, $29. For Group V, Manufactures and Miscellaneous, the freight revenue was $5.26, or 4.54 per cent of the average value, $115.83. For Group VI, L. C. L. Freight, the freight revenue, $13.87, was 6.94 per cent of the average value, $200. For all carload traffic the freight revenue averaged $3.46 per ton, or 7.09 per cent of the average value $48.74.

The lowest percentage of freight revenue in relation to value was shown for the class of copper ore and con-

Summary of Carload Traffic According to Percentage Relation of Freight Revenue and Commodity Value

Group (a)	Percentage which freight revenue is of commodity value at destination (b)	Weighted average [1] (c)	Freight revenue [2] Aggregate (d)	Freight revenue [2] Per cent of total (e)	Market value [2] Aggregate (f)	Market value [2] Per cent of total (g)
	(Per cent)	(Per cent)	(Millions)		(Millions)	
A	0— 4.99	2.73	$1,133.6	26.26	$41,572	68.30
B	5— 9.99	6.17	483.9	11.21	7,848	12.89
C	10—14.99	13.15	654.3	15.15	4,977	8.18
D	15—19.99	15.76	285.9	6.62	1,814	2.98
E	20 and over	37.77	1,760.0	40.76	4,659	7.65
	Total	....	4,317.7	100.00	60,870	100.00

Group (a)	Percentage which freight revenue is of commodity value at destination (b)	Tons originated Aggregate (h)	Tons originated Per cent of total (i)	Freight revenue per ton (j)
	(Per cent)	(Thousands)		
A	0— 4.99	175,711	14.07	$6.45
B	5— 9.99	119,902	9.60	4.04
C	10—14.99	159,699	12.79	4.10
D	15—19.99	50,511	4.04	5.66
E	20 and over	743,166	59.50	2.37
	Total	1,248,989	100.00	3.46

[1] Column (d) divided by column (f) times 100.
[2] For commodity classes falling in the groups shown in first column.

centrates, for which the average value was $265.51 and the average freight revenue $0.37, or 0.14 per cent of the value. The highest percentage shown was that for fresh grapes, for which the average value was given as $50.63 and the freight revenue as $30.88, or 61 per cent of the value.

The highest average value per ton at destination shown was that of tobacco, manufactured products, $1,924, on which the average freight revenue was $16.69 or 0.87 per cent of the value. The highest average freight revenue was that for passenger automobiles, $35.45 or 4.21 per cent of the average value per ton at destination, which was $842. The lowest average value per ton was that for gravel and sand, $1.63, on which the freight revenue averaged $0.86 or 52.92 per cent. The lowest average freight revenue was that on copper ore and concentrates, $0.37.

The tabular statement given in the report follows:

Freight Revenue and Value of Commodities Transported, Calendar Year, 1928, Class I Railways

	Commodity Group or Class (a)	Revenue freight originated (tons) (b)	Freight revenue (thousands) (c)	Freight revenue per ton (d)	Value per ton at point of production (e)	Value per ton at destination (f)	Total value at destination (thousands) (g)	Per cent freight revenue of value at destination (h)
	GROUP I. PRODUCTS OF AGRICULTURE (C. L.)							
10	Wheat	26,950,060	$117,554	$4.36	$32.40	$36.76	$990,684	11.87
20	Corn	17,044,938	65,076	3.82	24.49	28.31	482,542	13.49
30	Oats	5,888,045	22,101	3.75	25.56	29.31	172,579	12.81
40	Barley and rye	4,297,068	17,570	4.09	23.83	27.92	119,974	14.64
41	Rice	1,067,702	4,778	4.48	.....	80.00	85,416	5.59
42	Grain, N.O.S.	141,001	700	4.96	29.34	34.30	4,836	14.47
50	Flour, wheat	9,656,166	44,760	4 64	71.09	75.73	731,262	6.12
51	Meal, corn	268,232	1,095	4.08	49.23	53.31	14,299	7.66
52	Flour and meal, edible, N.O.S.	829,480	4,474	5.39	58.52	63.91	53,012	8.44
60	Cereal food preparations, edible, N.O.S.	831,799	5,204	6.25	.....	147.60	122,774	4.24
61	Mill products, N.O.S.	9,748,620	34,208	3.51	44.11	47.62	464,229	7.37
70	Hay and alfalfa	3,309,381	17,822	5.39	11.43	16.82	55,664	32.02
71	Straw	689,656	2,139	3.10	.....	11.00	7,586	28.20
80	Tobacco, leaf	944,955	7,864	8.32	370.00	378.32	357,495	2.20
90	Cotton in bales	3,423,519	39,204	11.45	360.00	371.45	1,271,666	3.08
91	Cotton linters, noils, and regins	348,660	3,272	9.38	.....	178.82	62,347	5.25
100	Cottonseed	2,707,933	6,969	2.57	36.29	38.86	105,230	6.62
101	Cottonseed meal and cake	2,275,922	8,966	3.94	45.75	49.69	113,091	7.93
110	Oranges and grapefruit	1,364,920	38,139	27.94	74.00	101.94	139,140	27.41
111	Lemons, limes, and citrus fruits, N.O.S.	177,930	5,647	31.74	62.23	93.97	16,720	33.77
120	Apples, fresh	1,903,442	29,505	15.50	46.82	62.32	118,623	24.87
121	Bananas	1,005,030	15,972	15.89	13.76	29.65	29,799	53.60
122	Berries, fresh	100,072	2,760	27.58	207.34	234.92	23,509	11.74
123	Cantaloupes and melons, N.O.S.	414,349	12,676	30.59	40.00	70.59	29,249	43.34
124	Grapes, fresh	1,138,493	35,160	30.88	19.75	50.63	57,642	61.00
125	Peaches, fresh	614,058	9,678	15.76	41.12	56.88	34,928	27.71
126	Watermelons	540,482	6,666	12.33	12.60	25.93	14,015	47.56
127	Fruits, fresh, domestic, N.O.S.	625,626	13,808	22.07	54.74	76.81	48,054	28.73
128	Fruits, fresh, tropical, N.O.S.	59,818	999	16.70	83.50	100.20	5,994	16.67
130	Potatoes, other than sweet	4,511,075	46,776	10.36	18.00	28.36	127,934	36.56
140	Cabbage	519,307	6,919	13.32	24.04	37.36	19,401	35.66
141	Onions	515,835	7,046	13.66	41.75	55.41	28,583	24.65
142	Tomatoes	349,438	8,068	23.09	29.13	52.22	18,248	44.21
143	Vegetables, fresh, N.O.S.	1,740,147	44,323	25.47	55.79	81.26	141,404	31.34
150	Beans and peas, dried	655,788	6,980	10.64	.....	136.80	89,712	7.78
151	Fruits, dried or evaporated	911,328	8,661	9.50	.....	177.20	161,487	5.36
152	Vegetables, dry, N.O.S.	310,484	3,226	10.39	28.62	39.01	12,112	26.63
160	Vegetable-oil cake and meal, except cottonseed	473,029	1,583	3.35	.....	40.58	19,196	8.25
161	Peanuts	371,727	3,200	8.61	92.00	100,61	37,399	8.56
162	Flaxseed	542,372	2,409	4.44	71.82	76.26	41,361	5.82
163	Sugar beets	5,259,674	3,510	.67	7.18	7.85	41,289	8.50
164	Products of agriculture, N.O.S.	3,494,350	20,809	5.96	252.61	258.57	903,534	2.30
(800)	Total Products of Agriculture	118,021,911	738,276	6.26	.....	62.48	7,374,019	10.01
	GROUP II. ANIMALS AND PRODUCTS (C. L.)							
170	Horses, mules, ponies, and asses	576,885	5,285	9.16	134.62	143.78	82,945	6.37
180	Cattle and calves, single-deck	7,923,694	49,493	6.25	223.84	230.09	1,823,163	2.71
181	Calves, double-deck	52,620	506	9.62	236.40	246.02	12,946	3.91
190	Sheep and goats, single-deck	453,407	2,734	6.03	153.22	159.25	72,205	3.79
191	Sheep and goats, double-deck	908,346	8,397	9.24	153.22	162.46	147,570	5.69
200	Hogs, single-deck	4,190,928	23,597	5.63	158.60	164.23	688,276	3.43
201	Hogs, double-deck	1,679,916	14,646	8.72	158.60	167.32	281,083	5.21
210	Fresh meats, N.O.S.	2,935,349	40,854	13.92	406.69	420.61	1,234,637	3.31
220	Meats, cured, dried, or smoked	691,918	9,605	13.88	491.59	505.47	349,744	2.75
221	Butterine and margarine	50,034	717	14.33	450.00	464.33	23,232	3.09
222	Packing-house products, edible, N.O.S., not including canned meats	1,461,049	15,125	10.35	273.77	284.12	415,113	3.64
230	Poultry, live	160,249	5,240	32.70	424.00	456.70	73,186	7.16
231	Poultry, dressed	246,401	6,996	28.39	516.00	544.39	134,138	5.22
240	Eggs	634,575	16,433	25.90	572.00	597.90	379,412	4.33
250	Butter	504,388	11,581	22.96	926.00	948.96	478,644	2.42
251	Cheese	249,706	4,210	16.86	452.20	469.06	117,127	3.59
260	Wool	393,870	6,170	15.67	1,306.51	1,322.18	520,767	1.18
270	Hides, green	712,562	6,352	8.91	662.87	671.78	478,685	1.33
271	Leather	201,926	2,042	10.11	994.27	1,004.38	202,810	1.01
280	Fish or sea-animal oil	102,272	926	9.05	238.98	248.03	25,367	3.65
281	Animals, live, N.O.S.	24,023	226	9.41	333.00	342.41	8,226	2.75
282	Animal products, N.O.S. (other than fertilizer and fertilizer materials)	1,479,730	11,504	7.77	494.82	502.59	743,697	1.55
(810)	Total Animals and Products	25,633,848	242,639	9.47	.....	323.52	8,292,973	2.93
	GROUP III. PRODUCTS OF MINES (C. L.)							
290	Anthracite coal	69,997,398	165,680	2.37	.....	10.47	732,873	22.61
300	Bituminous coal	346,057,487	784,470	2.27	.....	3.91	1,353,084	57.98
310	Coke	16,241,157	33,451	2.06	5.49	7.55	122,621	27.28
320	Iron ore	68,684,091	79,197	1.15	3.86	5.01	344,107	23.02
330	Copper ore and concentrates	5,916,374	2,171	.37	265.14	265.51	1,570,857	.14
331	Lead ore and concentrates	1,352,799	1,868	1.38	92.00	93.38	126,324	1.48
332	Zinc ore and concentrates	1,334,539	4,630	3.47	.....	51.06	68,142	6.79
333	Ores and concentrates, N.O.S.	3,234,331	8,735	2.70	48.03	50.73	164,078	5.32
350	Gravel and sand (other than glass or molding)	85,667,157	73,893	.86	.77	1.63	139,637	52.92
351	Stone, broken, ground, or crushed	35,466,459	31,322	.88	.81	1.69	59,938	52.26
352	Stone, rough, N.O.S.	6,253,568	10,542	1.69	8.79	10.48	65,537	16.09
353	Stone, finished, N.O.S.	916,623	4,328	4.72	29.36	34.08	31,239	13.85

	Commodity Group or Class	Revenue freight originated (tons)	Freight revenue (thousands)	Freight revenue per ton *	Value per ton at point of production	Value per ton at destination	Total value at destination (thousands)	Per cent freight revenue of value at destination
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
360	Petroleum, crude	7,632,492	34,006	4.46	11.00	15.46	117,998	28.82
370	Asphalt (natural, by-product, or petroleum)	2,899,326	12,819	4.42	17.07	21.49	62,307	20.57
380	Salt	3,340,663	16,779	5.02	9.78	14.80	49,442	33.94
390	Phosphate rock, crude (ground or not ground)	4,801,139	7,346	1.53	.....	4.95	23,766	30.91
391	Sulphur (brimstone)	1,810,738	5,458	3.01	18.00	21.01	38,044	14.35
392	Products of mines, N.O.S.	34,976,756	55,985	1.60	.....	33.97	1,188,160	4.71
(820)	Total Products of Mines	696,583,097	1,332,680	1.91	.....	8.98	6,258,154	21.30
	GROUP IV. PRODUCTS OF FORESTS (C. L.)							
400	Logs	30,832,653	20,777	.67	4.30	4.97	153,238	13.56
401	Posts, poles, and piling	4,839,778	21,018	4.34	4.30	8.64	41,816	50.26
402	Wood (fuel)	3,868,454	3,871	1.00	.....	2.46	9,516	40.68
410	Ties, railroad	4,239,705	12,825	3.02	.....	20.80	88,186	14.54
420	Pulp wood	6,892,658	12,234	1.77	.....	3.25	22,401	54.61
430	Lumber, shingles, and lath	39,415,454	258,131	6.55	.....	41.78	1,646,778	15.67
431	Box, crate, and cooperage materials	3,093,166	17,814	5.76	.....	26.19	81,010	21.99
432	Veneer and built-up wood	267,628	1,898	7.09	.....	126.80	33,935	5.59
440	Rosin	552,283	2,581	4.67	.....	65.40	36,119	7.15
441	Turpentine	68,953	720	10.44	.....	161.43	11,131	6.47
442	Crude rubber (not reclaimed)	453,528	3,910	8.62	.....	412.00	186,854	2.09
443	Products of forests, N.O.S.	2,212,677	7,839	3.54	.....	223.44	494,401	1.59
(830)	Total Products of Forests	96,736,937	363,618	3.75	.....	91.43	2,805,385	12.96
	GROUP V. MANUFACTURES AND MISCELLANEOUS (C. L.)							
450	Petroleum oils, refined, and all other gasolines	42,562,231	252,022	5.92	.....	40.11	1,707,171	14.76
451	Fuel, road, and petroleum residual oils, N.O.S.	11,893,736	45,951	3.86	7.99	11.85	140,941	32.60
452	Lubricating oils and greases	3,721,437	23,168	6.23	.....	168.20	625,946	3.70
453	Petroleum products, N.O.S.	302,392	1,493	4.94	.....	150.24	45,431	3.29
460	Cottonseed oil	914,287	5,692	6.23	.....	197.33	180,416	3.15
461	Linseed oil	284,516	1,836	6.45	.....	200.00	56,903	3.23
462	Vegetable oils, N.O.S.	361,911	3,296	9.11	.....	210.35	76,128	4.33
470	Sugar (beet or cane)	4,040,203	34,240	8.47	.....	84.00	339,377	10.09
471	Table sirups and edible molasses	828,549	5,800	7.00	.....	77.00	63,798	9.09
472	Molasses, blackstrap and beet residual	735,663	3,114	4.23	28.50	32.73	24,078	12.93
490	Iron, pig	8,033,516	14,114	1.76	17.00	18.76	150,709	9.37
491	Iron and steel, rated 6th class in official classification, N.O.S.	5,129,797	8,802	1.72	.....	40.93	209,963	4.19
500	Rails, fastenings, frogs, and switches	2,551,160	8,329	3.26	140.85	144.11	367,648	2.27
510	Cast-iron pipe and fittings	1,899,837	11,582	6.10	.....	49.45	93,947	12.33
511	Iron and steel pipe and fittings, N.O.S.	5,044,761	43,941	8.71	.....	85.10	429,309	10.24
512	Iron and steel: Nails and wire, not woven	1,667,427	9,146	5.49	70.04	75.53	125,941	7.26
513	Iron and steel, rated 5th class in official classification, N.O.S., etc.	33,386,293	141,716	4.24	79.19	83.43	2,785,418	5.09
520	Copper: Ingot, matte, and pig	999,088	7,560	7.57	270.00	277.57	277,317	2.73
521	Copper, brass, and bronze: Bar, sheet, and pipe	358,105	2,702	7.55	.....	445.04	159,371	1.70
522	Lead and zinc: Ingot, pig, or bar	1,217,734	9,192	7.55	.....	110.41	134,450	6.84
523	Aluminum: Ingot, pig, or slab	73,413	882	12.01	.....	371.38	27,264	3.24
530	Machinery and boilers	3,772,172	36,314	9.63	.....	516.46	1,948,176	1.86
540	Cement, natural or Portland (building)	26,079,815	70,892	2.72	8.89	11.61	302,787	23.41
550	Brick, common	7,921,124	15,553	1.96	.....	5.49	43,487	35.76
551	Brick, N.O.S., and building tile	10,391,559	27,884	2.68	49.00	51.68	537,036	5.19
552	Artificial stone, N.O.S.	705,674	2,288	3.24	.....	95.27	67,230	3.40
560	Lime, common (quick or slaked)	2,797,520	9,447	3.38	9.04	12.42	34,745	27.19
561	Plaster (stuco or wall) and dry kalsomine	2,502,024	10,341	4.13	.....	23.92	59,848	17.28
570	Sewer pipe and drain tile (not metal)	2,555,723	9,380	3.67	12.72	16.39	41,888	22.39
580	Agricultural implements and ports, N.O.S.	1,333,723	15,325	11.49	410.32	421.81	562,578	2.72
581	Vehicles, horse-drawn, and parts, N.O.S.	93,425	1,088	11.65	200.88	212.53	19,856	5.48
582	Tractor and parts	475,772	6,094	12.81	402.00	414.81	197,355	3.09
583	Railway car wheels, axles, and trucks	401,333	1,833	4.57	63.47	68.04	27,307	6.71
590	Automobiles (passenger)	3,705,214	131,335	35.45	.....	842.00	3,119,790	4.21
591	Autotrucks	257,802	6,685	25.93	.....	842.00	217,069	3.08
592	Automobiles and autotrucks, K.D. and parts, N.O.S.	4,051,729	43,799	10.81	.....	842.00	3,411,556	1.28
593	Automobile and autotruck tires	736,023	12,292	16.70	1,028.61	1,045.31	769,372	1.60
610	Furniture, metal	226,459	2,720	12.01	328.09	340.10	77,019	3.53
611	Furniture, other than metal	835,406	16,362	19.59	385.48	405.07	338,398	4.84
620	Beverages	813,182	5,108	6.28	.....	294.90	239,807	2.13
630	Ice	3,922,153	4,703	1.20	.....	5.00	19,611	23.98
640	Fertilizers, N.O.S.	12,859,221	37,233	2.90	.....	34.10	438,499	8.49
650	Newsprint paper	1,448,934	15,387	10.62	65.00	75.62	109,568	14.04
651	Printing paper, N.O.S.	1,853,754	10,523	5.68	.....	146.03	270,704	3.89
660	Alcohol, denatured or wood	368,227	2,707	7.35	152.60	159.95	58,898	4.60
661	Sulphuric acid	2,279,672	5,845	2.56	.....	15.50	35,335	16.54
662	Explosives, N.O.S.	330,562	5,846	17.69	.....	636.75	210,485	2.78
670	Cotton cloth and cotton fabrics, N.O.S.	530,324	6,881	12.98	792.75	805.73	427,298	1.61
671	Bagging and bags, burlap, gunny or jute	406,860	3,309	8.13	256.38	264.51	107,619	3.07
680	Canned food products, N.O.S.	4,804,656	44,203	9.20	.....	282.59	1,357,748	3.26
690	Tobacco, manufactured products	200,208	3,342	16.69	.....	1,924.00	385,200	.87
691	Paints in oil and varnishes	496,654	4,191	8.44	.....	335.89	166,821	2.51
692	Furnace slag	8,784,484	6,603	.75	1.10	1.85	16,251	40.63
693	Scrap iron and scrap steel	11,746,937	24,863	2.12	12.25	14.37	168,803	14.73
694	Paper bags and wrapping paper	1,511,719	9,785	6.47	.....	178.75	270,220	3.62
695	Paperboard, pulpboard, and wallboard (paper)	2,318,165	11,753	5.07	62.67	67.74	157,033	7.48
696	Building paper and prepared roofing materials	2,034,812	10,842	5.33	65.20	70.53	143,515	7.55
697	Building woodwork (millwork)	521,802	5,556	10.65	123.62	134.27	70,062	7.93
698	Soap and washing compounds	1,109,912	8,321	7.50	.....	164.41	182,481	4.56
699	Glass, flat, other than plate	506,020	3,689	7.29	.....	74.00	37,445	9.85
700	Glass: Bottles, jars, and jelly glasses	1,496,045	10,114	6.76	63.58	70.34	105,232	9.61
701	Manufactures and miscellaneous, N.O.S.	56,820,396	345,471	6.08	.....	200.00	11,364,079	3.04
(840)	Total Manufactures and Miscellaneous	312,013,252	1,640,485	5.26	.....	115.83	36,139,737	4.54
(850)	Grand Total, Car-load Traffic	1,248,989,045	4,317,698	3.46	.....	48.74	60,870,268	7.09
	GROUP VI. L.C.L. FREIGHT							
710	All L.C.L. freight	36,953,931	512,576	13.87	.....	200.00	7,390,786	6.94
(860)	Grand Total, Car-load and L.C.L. Traffic	1,285,942,976	4,830,274	3.76	.....	53.08	68,261,054	7.08

* Column (c) divided by column (b). No correction made for varying lengths of haul.

Erie Extends Itself to Move Large Shipment

ON August 3 the Erie undertook to transport four large transformers made by the Westinghouse Electric & Manufacturing Company from its Sharon, Pa., plant to the plant of the Public Service Products Company at Roseland, N. J., about a mile beyond the end of the Erie's Caldwell branch at Essex Fells, N. J., on the Morristown and Erie railroad. These transformers were assembled on four well cars with six-wheel trucks, and, as presented for shipment had a

Lowering the Track 20 In. at Caldwell, N. J.

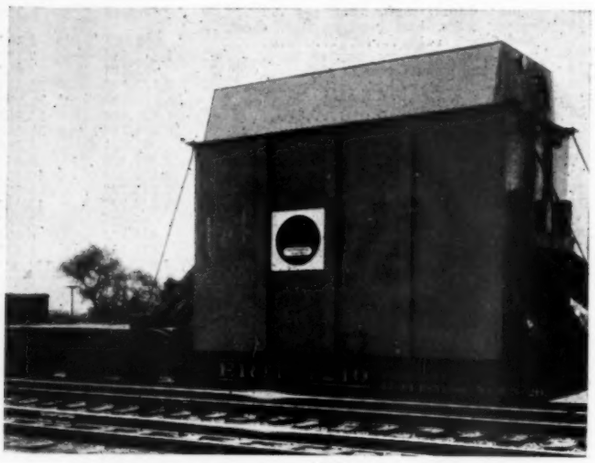
maximum height of 17 ft. 9½ in. above the top of rail. Between the heights of 2 ft. 6 in. and 14 ft. 7 in. above the top of rail, they were 11 ft. 4¼ in. wide, and at their maximum height they were 8 ft. 6 in. wide. Accompanying the four transformers was a fifth load of transformer tops in a gondola car, with the same ruling height of 17 ft. 9½ in. and a maximum width of 11 ft. 4¼ in., and seven other cars of transformer accessories and parts. The loading on each of the four well cars was approximately 269,050 lb.

Track Changes Were Large Item

The problem was to move the loads over the line from Sharon to Essex Fells under the restricting clearances existing at certain points. Measuring clearances over the most open route and a careful checking of the dimensions of the loads to be moved indicated that considerable alteration had to be made in tracks, particularly on branch line territory, and the track forces were immediately put to work. Few changes were necessary between Sharon and Port Jervis, N. Y., a distance of 470 miles, but from the latter point to Essex Fells, about 105 miles, through the rugged country adjacent to the Hudson river and the highly industrial territory in Northern New Jersey, a number of detours from the normal route, and a number of bridge and track changes were necessary to get the loads through.

Just east of Port Jervis, the special transformer train was detoured for a few miles over another track to avoid a tunnel at Otisville, N. Y., was then run down the main freight line and into Newark, N. J. on the Newark branch, from which point it made a wide loop in order to get out on the Greenwood Lake division of the Erie and thence to the Caldwell branch. Some of the major alteration work required included the lining over of the eastbound track on a two-track bridge at Paterson, N. J., and on a similar bridge at Belleville, N. J.; the temporary closing of an overhead highway bridge at Bloomfield, N. J., while the transformer train was passing, and the removal of one of the floor stringers of the bridge to let the high loads by; the raising of the track three inches over a through girder bridge at Montclair, N. J., to preclude interference with the girders; and the depressing of 450 ft. of track at an overhead boulevard crossing of the Caldwell branch near Caldwell, N. J.

The work at the latter point was far the most extensive and difficult, because at this point it was necessary to lower the tracks a maximum of 20 in. in order to secure a vertical clearance of 18 ft., and in doing so, all of the excavation, which included about six inches of rock, had to be done with picks and shovels under traffic. On August 21 this latter work was completed and the transformers were removed through this last point of close clearances and on to Roseland. Throughout the entire run from Sharon to Essex Fells, which was made in two main movements, the train was moved only during daylight hours; speed was restricted to 25 mi. per hr. and reduced to a minimum at close clearance points; and observers on the train were constantly on duty watching for points of interference with roadway structures. So protected, the transformers reached their destination without mishap.



One of the Large Transformers as Mounted for Movement Over the Road

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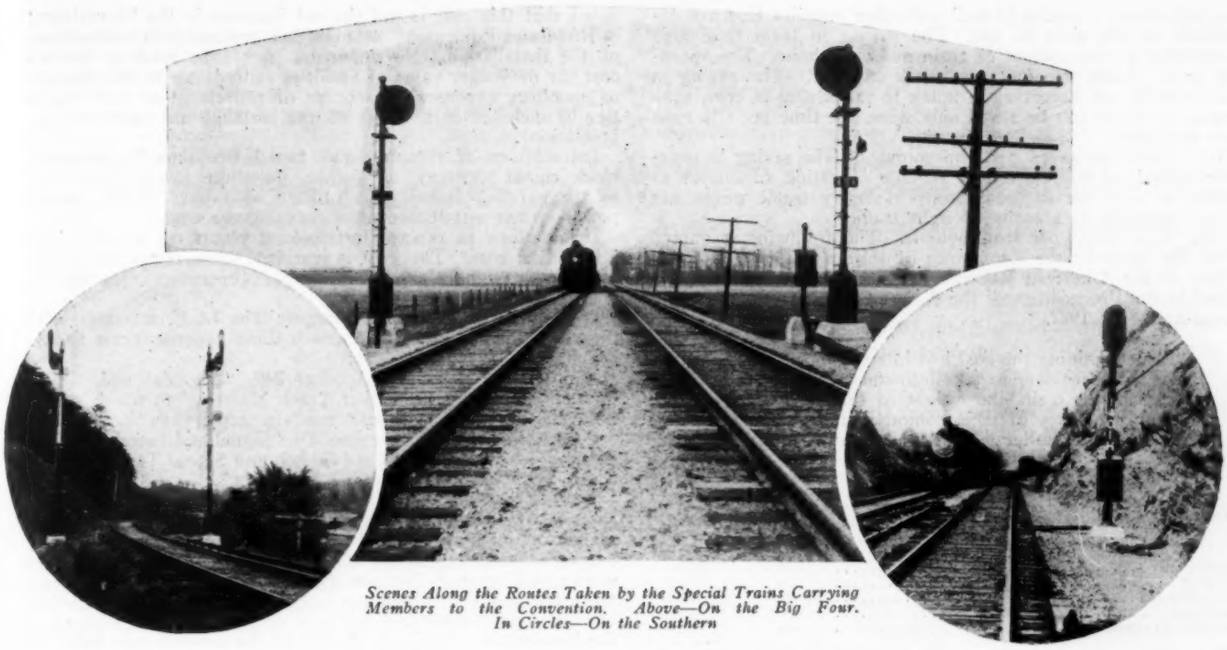
THE CHICAGO, ROCK ISLAND & PACIFIC, in recognition of the interest, effort and results obtained in casualty reduction and the elimination of all classes of accidents, is awarding, each month, a safety banner to the division having the most attractive safety record.



Scenes Along the Routes Taken by the Special Trains Carrying Members to the Convention. Above—On the Big Four. In Circles—On the Southern

Signal Section Meets in Atlanta, Ga.

Studies made of train operation by signal indication and economics of signaling facilities

THE ways in which modern signaling facilities help to solve operating problems, as well as methods for determining the economies to be accomplished thereby, were set forth in reports presented this week before the stated meeting of the Signal Section, A. R. A., at the Biltmore hotel in Atlanta, Ga. The reports on the economies of signaling and on highway crossing protection are of special interest to railway officers in general and are given herewith in abstract, while the other eight reports and papers, which were presented at the convention, were of such a technical character that they are mentioned briefly here.

The three-day meeting, which started on Tuesday, was attended by 345 members, interest in the work being evidenced by the presence of as high as 355 men, some of whom were guests, at certain sessions. The sessions were presided over by H. W. Lewis, chairman of the Signal Section and signal engineer of the Lehigh Valley.

Economies of Signaling Well Established

J. E. Saunders, signal engineer of the Delaware, Lackawanna & Western, as chairman, presented the report of the Committee on Economics of Railway Signaling which comprised the following four subjects: (1) An outline for estimating the economic value of remote-power switch machines; (2) a comparative study of train operation on single track by signal indication and by operation by time tables, train orders and a manual block system; (3) economic results of modernizing an existing signal system on a single-track line; and (4) a revised report on train operation by signal indication, including a complete list of all the installations in the United States and Canada.

The committee first presented that part of the report covering the proposed outline for estimating the economic value of remote-power switch machines. This outline provided for tabulating all essential information under the following two headings:

(A) Savings effected by the elimination of train stops through the use of remote-power switch machines for the operation of switches at passing sidings, at ends of double track and at other points; the machines controlled from train order or block signal stations usually located at some distance (a mile or more) from the switches to be operated. In these cases the savings are due to the elimination of train stops.

(B) Savings effected by the elimination of interlocking plants (usually small ones) by the installation of remote-power switch machines operated from an adjacent interlocking, located some distance from the switches. In these cases, as the switches were previously operated from an interlocking plant, no train stops are eliminated and the saving is in the release of the interlocking operators of the discontinued plant.

The outline provides two columns, A and B, for listing the two types of installations. Following are explanatory notes for certain of the items:

(4) Saving in time and coal per train stop:

(a) The number of train stops that can be eliminated by the use of remote power switch machines should be determined by an actual count of the number of train stops made per day at the site of the proposed installation. The count should, if necessary, be corrected to reflect average train movement throughout the year.

(b) Train time saved per stop, minutes. The figures for this item should represent the average actual time that could be saved if the trains proceeded at normal speeds without stopping to throw switches. No waiting time other than that to throw switches should be included. Train time saved reduces the time that the locomotives, cars and track facilities are in

use and effects a saving in coal and other supplies that are dependent on the time in use. The saving in train time also produces a greater output of train miles per hour. The speeding up of trains also increases track capacity. The saving in train time is not, however, an index to the saving in crew time wages, as wages can be saved only when the time per trip runs into overtime.

(c) Overtime saved per stop, minutes. The saving in overtime should, of course, reflect average operating conditions as trains on overtime in the seasons of heavy traffic might not be on overtime in seasons of light traffic.

(d) Coal saved per stop, pounds. The following is quoted from the study by the Economics of Railway Operation Committee of the American Railway Engineering Association, published in the Proceedings of the American Railway Engineering Association for 1927.

> "In determining the coal lost in stopping and starting trains it is necessary to take into consideration the kind of cars in the train, the weight of the train, the type, size and efficiency of the locomotive, and the innumerable conditions under which the stop and start may be made."

(e) Overtime crew-hour rate. Average rates per hour I.C.C. Wage Statistics, April, 1928.

	Straight time	Overtime
Enginemen	$1.00	$1.47
Firemen	.76	1.11
Conductors	.81	1.21
Brakemen	.64	.96
(Second Brakemen)	.64	.96
Total rate per crew-hour	$3.85	$5.71

(f) Coal price per ton on tender. The price of coal or fuel oil should include freight and cost of handling.

6. Saving per installation per year: The method of computing the figures for the items under this head is fully set forth in an outline which was included in the report.

7. The cost per installation should include the total cost of the work, including charges to operating expenses in connection therewith, less salvage of retired facilities. It will be noted that this cost is not the net increase in the "Investment in Road and Equipment" account, but represents the actual cost of the installation. No deduction should be made from this cost for the ledger value of facilities retired, nor should charges to operating expenses on account of retirement of such facilities be included in the cost of the installations (deferred depreciation).

Installations of remote-power switch machines in automatic block signal territory, as a rule, show the lowest first costs as the existing signaling is utilized as a part of the remote power switch installation, thus reducing the cost.

Installations to replace interlocking plants, as a rule, show a high first cost. This cost is justified, however, by the saving effected through release of the labor (operators) for the replaced plants.

8. Annual expenses and charges: The I.C.C. accounts, with the exception of interest, to which these expense items should be charged, are as follows:

Maintenance expense: Account 249, "Signals and Interlocker." Account 216, "Other Track Material" to which should be charged track materials used in repairs to interlockers.

Operation expense: Account 404, "Signal and Interlocker Operation." Account 379, "Yard Switch and Signal Tenders." Account 389, "Yard Supplies and Expenses."

Interest charges should be included in annual charges irrespective of whether the new facilities are financed by borrowed money or out of income. If the installation is not financed by borrowed money, but out of income, there still would be the element of interest, because there would be a loss of income from the funds used for the installation which previously had been earning from 2 to 6 per cent or even more, depending on the investment. The rate should be the current rate paid for or earned by funds used for the new facilities.

Locomotive and freight car repairs, depreciation and retirements were also not included in the inquiry as there does not seem to be a full agreement among authorities as to the advisability of including these items in a study of this kind.

Outline For Preparing Estimates of the Economic Value of Remote Power Switches

ITEMS	A	B
1. Number of installations at:		
(a) End double track	.....	.....
(b) Passing sidings	.....	.....
(c) Other points	.....	.....
(d) Total number of installations	.....	.....
2. Switch machines: total number	.....	.....
3. Distances from points of operation:		
(a) Minimum distance	.....	.....
(b) Maximum distance	.....	.....
(c) Average distance	.....	.....
4. Saving in time and coal per train stop (Col. A):		
(a) Train stops eliminated per installation per day	.....	
(b) Train time saved per stop, minutes	.....	
(c) Overtime saved per stop, minutes	.....	
(d) Coal saved per stop, lb.	.....	
(e) Overtime crew hour rate	.....	
(f) Coal price per ton on tender	.....	
5. Saving in labor per installation (Col. B):		
(a) Operators or switch tenders released, total man hours per year		.....
(b) Man hour rates		.....
6. Saving per installation per year: Col.		
(a) Train stops eliminated (4a × 365)	A	.....
(b) Train hours saved (4b × 6a ÷ 60)	A	.....
(c) Overtime crew hours saved (4c × 6a ÷ 60)	A	.....
(d) Coal saved, tons (4d × 6a ÷ 2000)	A	.....
(e) Labor released (5a × 5b)	B	.....
7. Cost per installation	.....	.....
8. Annual expenses and charges:		
(a) Maintenance expense	.....	.....
(b) Operation expense	.....	.....
(c) Interest charges	.....	.....
(d) Total annual expenses and charges	.....	.....
(e) Per cent of cost (8d ÷ 7)	.....	.....
9. Gross saving per installation per year:		
(a) Overtime crew hours saved (4e × 6c)	.....	
(b) Coal saved (4f × 6d)	.....	
(c) Labor released (6e)		.....
(d) Other saving	.....	.....
(e) Total gross saving	.....	.....
(f) Deduct annual expenses and charges (8d)	.....	.....
10. Net saving per installation per year	.....	.....
11. Net saving all installations per year (1d × 10)	.....	.....
12. Total cost all installations (1d × 7)	.....	.....
13. Annual return on investment over and above 6 per cent interest charges (11 ÷ 12)	.....	.....

Notes: A—The items in this column are for installations where train stops are eliminated. B—The items in this column are for installations where labor is released (interlocking operators or others).

Comparison of Time Lost for Meets

Next the committee submitted the comparison in train operation on single track, by determining the time lost in making "meets" of through freight trains; first, under the scheme of train operation by signal indication, and, second, under the method of operation using time-tables, train orders and manual block. The report showed a reduction of 45 per cent in the delay time when making freight train meets under the authority of signal indication.

	Train operation by signal indication	Time-tables, train orders and manual block system
Miles of road	40	70
Number of trains per day:		
Passenger	12	6
Freight	21	22
Totals	33	28

Time lost in making "meets" under time-tables, train orders and manual block system ..... 20.3 min.
Time lost in making "meets" under train operation by signal indication ..... 11.15 min.

Saving in time ..... 9.15 min.
Per cent saved of lost time ..... 45 per cent

Train Operation By Signal Indication (Central control)

No. of "meets"	Per cent of total "meets"	Difference in arrival time, minutes
7	5.	0
18	12.9	2
11	7.9	3
30	21.4	4
10	7.1	5
14	10.	6
5	3.6	7
12	8.6	8
5	3.6	9
11	7.9	10
3	2.1	11
3	2.1	12
4	2.9	13
2	1.4	14
3	2.1	15
2	1.4	18
Total 140	100	†

† Average difference in arrival time equals the total difference in arrival time 839 min. (the sum of the number of "meets" times the difference per "meet") divided by the total number of "meets."

Average difference in arrival time .....5.9 min.
Average time lost in making "meets" compared with double track .....*5.25 min.

Total average time lost in making "meet"..11.15 min.

The above information taken from graphic train sheets for 10-day test period in February, 1927.

Time-Table, Train Orders and Manual Block System

Date Nov.	No. of "meets"	Delays, minutes	Average delay per "meet"
1	72	1655	23
2	71	1395	20
3	64	1520	24
4	84	1670	20
5	52	1125	22
6	79	1590	20
7	63	1080	17
8	53	1040	20
9	76	1460	19
10	79	1560	20
Totals,	693	14095	

Average meets per day 69.3
Average time lost per "meet" ..... †20.3 minutes

* From study of time lost in making average "meets" under operation by "signal dispatching." (Central control.)
† Total delay minutes divided by total number of "meets."

The above information was taken from dispatchers' train sheets and conductors' daily reports for 10-day test period in November, 1928.

The two territories compared above are similar as to traffic, track layout and motive power. The essential difference is in the method of operation of the two single-track lines: One under train operation by signal indication, (central control system with power-operated passing siding switches for signal dispatching); the other under the method of time-tables, train orders and manual block system.

This comparison shows the loss of 20 min. per "meet" under the time-table, train order and manual block system. Under train operation by signal indication this loss has been reduced to 11 min., a reduction of 45 per cent.

Economies on the Pennsylvania

The third subject included in the committee's report had to do with the replacement of the manual block system formerly used on the Columbus division of the Pennsylvania between Columbus, Ohio, and Indianapolis, Ind., with an automatic block signal and continuous train control system. Position-light-type automatic signals are used, the block sections averaging 1.5 mile. The controlled-manual block system is employed for opposing movements and automatic block signals for following movements. The total cost of this installation, including the cost of the engine and wayside equipment for train control and the revision of existing interlocking plants, amounted to $2,329,227. After deducting interest charges, the report showed that an annual saving of $228,190 has been made. The figures submitted by the committee are, in part, as follows:

Tracks Included in Installation

	Single	Double	Three	Total
Road miles	46.7	116	24.1	186.8
Track miles	46.7	232	72.3	351.

Trains Per Day Before and After the Installation

	Before	After
Passenger	17	16
Through freight	16	16
Local freight	2	2
Total	35	34

Data on Through Freight Trains

Number per year	5,840
Train miles per year	1,086,824
Train speed, m.p.h., "before"	13.35
Train speed, m.p.h., "after"	16.52
Increase	23.7 per cent
Train hours per year, "before"	81,410
Train hours per year, "after"	65,790
Decrease	19.1 per cent
Train hours saved per year	15,620
Straight time hours	12,058
Overtime hours	3,562
Car days saved per year (1,017,328 car hours divided by 24 hours)	42,388
Train stops eliminated	15,620
Gross ton miles per freight train hour, "before"	29,171
Gross ton miles per freight train hour, "after"	42,691
Increase	46.3 per cent

Savings Per Year

Through freight train engine straight time hours	$89,591
Through freight train crew and engine over-time hours	79,098
Train stops eliminated	15,620
Coal saved by reducing through freight train hours	65,632
Wages of operator-levermen	75,614
Per diem saved	42,388
Total savings per year	$367,943
Less interest on cost of installation at 6 per cent	139,753
Annual saving over and above 6 per cent interest charges	$228,190*

* Maintenance cost of wayside signals not materially increased.

Installations of Train Operation by Signal Indication

A study of train operation by signal indication, including a complete list of installations, concluded the committee's report. In this, the committee pointed out the increased efficiency secured in railway operation when trains are operated by signal indication instead of by train orders and time table superiority. Following is a brief abstract of this part of the report:

Train operation by signal indication was first put into successful use in 1882 on the Pennsylvania at Louisville, Ky. This method of directing train movement, therefore, is not new in principle. The Louisville installation led to a similar one in 1889 on the Nashville, Chattanooga & St. Louis near Chattanooga, Tenn. In both of these installations train movements were directed by signal indications given under the instructions of the dispatchers and without the use of written train orders.

It was not until 1907, however, that this method of operation received substantial recognition, following an installation made on a single-track line in which track circuits, for controlling the manually-operated signals, fully established the efficiency and reliability of the method as a means for directing train movements without train orders on single-track lines.

This installation was followed by many others, so that today there are 167 installations for directing train movements by signal indications without the use of train orders on 41 railroads in this country and Canada. These installations comprise a total of 2249 track miles, consisting of 819 miles of single-track and 1430 miles of multiple-track lines (either-direction operation).

This mileage represents lines on which, with few exceptions, there is heavy traffic movement and more than ordinary demand upon track capacity. In many of the installations the

Train Operation by Signal Indication
Summary of Installations

Road	Miles of road — Single track	Double track	Three track	Four track	Total	Miles of track Total	No. of installations
1. A. T. & S. F.	16.	175.7	...	...	191.7	367.4	3
2. A. C. L.	18.1	1.1	...	...	19.2	20.3	7
3. B. & O.	111.5	1.7	31.2	5.6	150.	151.7	12
4. B. & M.	33.5	107.	1.5	...	142.	252.	6
5. C. P.	7.9	2.5	...	...	10.4	10.9	4
6. C. of Ga.	28.1	....	...	...	28.1	28.1	2
7. C. R. R. of N. J.	....	....	2.4	12.	14.4	23.1	4
8. C. & O.	10.1	30.6	9.	1.	50.7	90.9	8
9. C. & N. W.	3.1	....	31.3	1.6	36.	37.6	9
10. C. B. & Q.	41.8	45.	30.9	6.9	124.6	185.1	9
11. C. M. St. P & P.	7.3	....	...	...	7.3	7.3	2
12. C. R. I. & P.	....	34.	3.1	6.6	43.7	50.3	4
13. C. C. C. & St. L.	93.6	1.5	...	...	95.1	96.6	1
14. D. & H.	....	2.6	...	...	2.6	5.2	1
15. D. L. & W.	2.9	1.	14.8	1.9	20.6	33.2	7
16. D. & R. G. W.	4.5	....	...	...	4.5	4.5	1
17. Erie	48.6	10.7	...	2.2	61.5	78.8	8
18. G. N.	5.3	1.	...	...	6.3	7.3	3
19. I. C.	....	21.	26.	6.	53.	74.	3
20. L. & N. E.	1.8	..	...	..	1.8	1.8	2
21. L. V.	16.4	....	1.9	..	18.3	22.1	3
22. L. I.	11.	....	...	..	11.	11.	3
23. L. & N.	5.4	....	...	...	5.4	5.4	2
24. M.-K.-T.	16.5	....	...	...	16.5	16.5	3
25. M. P.	65.6	....	...	...	65.6	65.6	8
26. N. C. & St. L.	30.3	4.1	...	...	34.4	38.5	3
27. N. Y. C.	36.9	4.4	...	26.9	68.2	79.2	6
28. N. Y. C. & St. L.	....	4.	...	...	4.	8.	1
29. N. Y. N. H. & H.	15.5	7.	...	1.6	24.1	33.9	6
30. N. Y. O. & W.	2.3	....	...	...	2.3	2.3	1
31. N. & W.	6.	....	...	...	6.	6.	1
32. N. P.	....	18.8	...	...	18.8	21.2	3
33. N. W. P.	4.5	....	...	...	4.5	4.5	3
34. P. R. R.	66.9	25.3	16.1	11.2	119.5	144.8	14
35. P. M.	20.	....	...	...	20.	20.	1
36. P. & R.	25.	....	...	...	25.	25.	1
37. St. L.-S. F.	9.5	4.7	...	...	14.2	18.9	3
38. S. P.	39.7	10.9	...	...	50.6	61.5	3
39. S. I. R. T.	0.8	....	...	...	0.8	0.8	1
40. T. & P.	1.	69.	...	...	70.	139.	2
41. W. M.	12.	....	...	...	12.	12.	3
Totals	819.4	583.6	168.2	*76.9	*1648.1	*2249.1	167

* These totals are less 6.6 miles of four-track road and 13.2 miles of track which on account of joint operation are included in both the C. R. I. & P. and N. Y. C. totals.
‡ Installations under construction.

greater capacity provided by this efficient method of operation postponed the necessity for building and maintaining many miles of additional track, thus effecting substantial savings in both construction and maintenance costs.

In the past two years a greatly improved system of train operation by signal indication has been developed. The new system simplifies the work of the train dispatcher and enables him to increase substantially the output of transportation, especially on single-track lines. In this new system, the signals and switches of a district are operated and controlled from a central point by a dispatcher solely by the use of electrically-operated signaling devices and without the aid of operators. The dispatcher directs the movement of trains by operating the signals whose indications authorize the movement. By direct operation of the switches as well as the signals, the train dispatcher also sets up the routes as required. Through the elimination of the task of issuing written train orders, the dispatcher can concentrate all of his efforts on keeping trains moving with minimum delay and thus assure a maximum utilization of trackage and equipment, together with a greatly reduced accident hazard * * * .

Discussion

In the discussion on train operation by signal indication, Mr. Saunders introduced H. M. Sperry, consulting engineer, who prepared this part of the report. Mr. Sperry presented a written discussion, an abstract of which follows.

Our estimate shows that trains whose movements are directed entirely by signal indication are making nearly 32,000,000 train-miles annually, nearly one and one-half times the total freight train mileage in the New England region.

The difference between train orders and signal indications as a means for directing train movements may be summed up as follows: Train orders are written instructions that must be delivered to the conductor and engineman. They must be correctly prepared, transmitted, delivered and understood. They must not be forgotten. On roads not equipped with signaling, safety depends entirely on the human element.

Signal indications, on the other hand, are simplified instructions for directing train movements given by aspects of fixed signals or cab signals. There is but little opportunity to misunderstand these indications.

The economic advantages of train operation by signal indication include reduction in delays, increased track capacity, increased safety and reduction in freight train operating costs. The cost of an installation must be balanced against the estimated savings.

One collateral advantage is the improvement in the quality of freight service from the view-point of the public. To this result the greater use of signaling has contributed a substantial part.

Developments in Highway Crossing Protection

On account of the absence of Committee chairman A. H. Rudd, chief signal engineer of the Pennsylvania, the report was presented by W. J. Eck, Assistant vice-president of the Southern, who explained that this report dealt with the latest developments in the field of highway crossing protection and the activities of federal and state authorities, including the courts, relative to the protection of life and property at railroad grade crossings. The committee recommended the adoption of a highway crossing signal, which will shine in both directions along the highway and referred to the early experiments on the New York, New Haven & Hartford using the Fresnel lens for this purpose. This lens has, however, proved unsatisfactory and C. H. Morrison, signal engineer of the New Haven recommended the continuance of the investigation of a spread-angle lens which would be suitable for highway crossing signals. The report, in part, was as follows:

The committee recommended that at crossings of highways with railroads where there are two or more main tracks, and flashing light signals are installed to indicate the approach of a train, such signals be arranged so as to flash in both directions along the highway, for the following reasons:

(a) The swinging light on the wig-wag signal or automatic flagman shines in both directions, and the experience of years with this indicates that the practice is a safe one, and that the objection which has been raised, that if the near signal is obscured, the driver may stop on the tracks, is largely theoretical.

(b) We have attempted to make the wig-wag and the alternately flashing lights resemble each other as closely as possible. Having the flashing lights shine both ways would be a further step toward uniformity.

(c) The arguments in favor of locating the signal in the center of the highway would disappear, as, even if the near light were hidden, the far one would be displayed. Drivers waiting for a train to pass and then instinctively starting across the tracks without observing the near signal, would, in most cases, keep their vehicles standing so long as the far light flashed.

The use of auxiliary protection in connection with highway crossing gates had been discussed at a meeting of the committee, it being the consensus that each crossing presents a separate problem which must be settled locally. Several members of the committee expressed themselves as being opposed to such auxiliary protection.

Federal and State Activities

The United States Supreme Court decided on February 18, 1929, that a railroad company may not replace a human flagman with electric signaling devices at dangerous grade crossings where a city ordinance requires the former method of protection.

The Board of Railway Commissioners for Canada issued General Order No. 468 on March 12, 1929, embodying specifications for highway crossing signals, and requiring that wig-wags shall be of the three-aspect type. Previous general orders covering highway crossing signals are rescinded.

The board has also issued Order No. 41591, approving a so-called lightning crossing signal, which is worked somewhat on the principle of neon gas tubes, to give the effect of a lightning flash.

The Public Service Commission of Connecticut has approved and, in some cases, required the installation of additional lights, so that, when a train is approaching, the highway crossing signals will flash in both directions along the highway.

Discussion

In presenting the report, Mr. Eck explained that two members of the committee had inspected an automatically controlled highway crossing gate on the Canadian National near Montreal and he then read a report of this inspection which explained the construction and operation of the gates and pointed out several features that were objectionable, the report concluding with the statement that "we do not believe that this automatic gate gives adequate protection for highway traffic for a railroad crossing at grade".

In discussing auxiliary protection, Mr. Eck stated that several members of the committee believed that part time operation of gates was undesirable. However, various others on the floor expressed the opinion that in certain cases such operation was adequate and therefore it was decided that no statement concerning this feature should be included in the report.

In discussing federal and state activities Mr. Eck read two additional items as follows:

A hearing was held in Columbus, Ohio, August 20. It was called by the Ohio Commission for the railroads to show cause why they should not install flashing light signals at crossing of state and federal highways with railroads. At the end of that day the hearing was adjourned until September 17.

On August 12 the Railroad Commission of Wisconsin made a ruling that further installations of automatic

railroad-highway grade crossing protective signals shall be of either the wigwag or flashing light type, provided that if the latter is used, an automatic movable stop sign shall be added to be displayed to view of the highway traffic on the approach of a train or when the flashing light signal is not in working order, such stop sign to be illuminated for night indication.

Other Committee Reports

The Committee on Signaling Instructions, A. Vallee (D. & H.) chairman, submitted two sets of instructions, one for maintaining and testing semaphore signals and the second for maintaining and testing color-light signals. The committee also submitted a complete set of definitions for technical terms used in signaling. The committee has been working on the technical definitions for a number of years and this is the first time that a complete list has been submitted. The maintenance and testing instructions are of particular benefit to signal maintainers.

The Committee on Signaling Practice, W. M. Post (Penna.) chairman, submitted a number of revisions for various parts of the Manual, the most important of which referred to take-siding and leave-siding indicators at non-interlocked switches and to switch indicators. The committee recommended that where a take-siding or leave-siding indicator is located less than stopping distance from a switch, an approach indication should be provided. The minimum distance of visibility under normal conditions shall be 500 ft. In respect to the use of switch indicators, the committee recommended several locations where they should be used and also the manner in which they should be connected to the automatic signal system.

The Committee on Alternating-Current Automatic Block Signaling, W. F. Follett (N. Y., N. H. & H.) chairman, submitted a revision of two specifications, one relating to fuses and the other to alternating-current relays. A new specification for an alternating-current power-transfer relay was also submitted by this committee. The last mentioned specification provided for a special relay commonly used in signal circuits for transfering a load from an alternating-current supply, not exceeding 15 volts, to another alternating-current source, or to a direct-current reserve source of power.

The revision of three specifications, relating respectively to aerial braided cable, lead-covered cable and armored submarine cable comprised the bulk of the report of the Committee on Overhead and Underground Lines of which G. H. Dryden, (B. & O.) is chairman.

The Committee on Interlocking, E. T. Ambach (B. & O.) chairman, submitted a revision of three specifications and a new specification for a car retarder system. The revised specifications related to the application of electric locks and circuit controllers to mechanical and electric interlocking machines. The car retarder specification provided for an operating mechanism enclosed in a substantial weatherproof case with a removable cover, which when opened shall provide access to all parts. Furthermore, the apparatus shall be so designed that it may be applied to either or both rails, and shall be so constructed that it will withstand twice the maximum stress without damage to any of the parts. Also, the retarder shoes shall be made of steel.

The Committee on D-C. Automatic Signaling, E. N. Fox (B. & M.) chairman, submitted a revised specification covering a universal switch circuit controller, such as is applied to track switches, derails or other movable apparatus for the purpose of controlling signal circuits. The committee also reported that it has been conducting an investigation of the so-called "a-c.-d.-c. track circuits" which utilize an alternating current in the track that is rectified at the relay end of the circuit, so as to control a direct-current track relay. The committee has also conducted a large amount of field research in connection with the track shunting of light-weight rail motor cars. Data have been accumulated by the use of recording ammeters and voltmeters connected continuously to track circuits for periods of several days. In this manner it is possible to obtain true records of the track circuit characteristics under varying traffic, train equipment, weather, ballast resistance, battery voltage, etc. The chairman of the subcommittee investigating this subject presented a verbal report outlining the results of these tests.

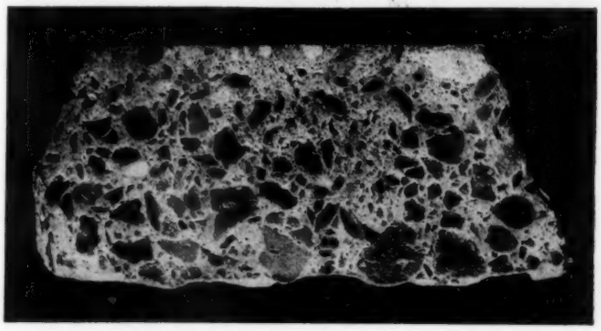
The Committee on Designs, H. G. Morgan (I.C.) chairman, submitted revisions of three specifications relating to gray-iron castings, malleable-iron castings and wrought-iron bars. Two revised drawings, one relating to power leadouts and the other to a cast-iron washer, and one new drawing of marking tags for wires were also submitted by this committee. Six drawings were designated as obsolete and were recommended for removal from the Manual.

The Committee on Contracts, D. Homewood (Pa.) chairman, submitted a revision of a special form designed for computing the interlocking unit distribution at jointly-owned interlocking plants. In doing so, the committee considered suggestions that it had received in respect to the form printed in the Manual and recommended the revised form, believing that it will cover all of the requirements.

Uses Light Weight Concrete in Making Roofing Slabs

AFTER some eight years of study and experimentation with light weight aggregates, the Federal Cement Tile Company, Chicago, is now using Haydite as the aggregate in concrete roof slabs, thereby adding a number of additional advantages to the roof construction developed by that company. Among the most important of these is the lighter weight; Haydite concrete, as used in Federal slabs, weighs only 95 to 100 lb. per cu. ft. Another is the improved insulating qualities, the heat conductivity being approximately one-fourth that of concrete which is made with the ordinary aggregates.

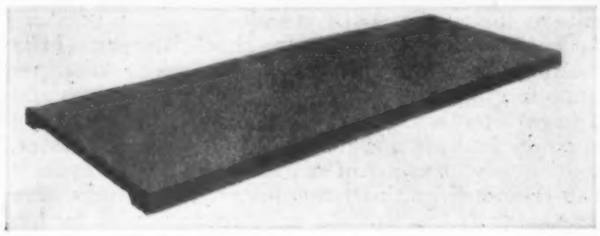
Haydite is a product of shale. Crushed and heated in a kiln to a temperature of 2000 deg. F., the shale is reduced to a state of incipient fusion, while gas gen-



Cross Section of a Specimen of Haydite Concrete

erated from the oxidization of the carbon content results in the formation of cellular clinker. This is then crushed to produce the desired grading of concrete aggregates which have a weight of about 50 lb. per cu. ft. ordinary bulk measurement.

This material is being used extensively in the manufacture of light weight building tile of sufficient strength for the purpose intended, but not enough for use in slabs subject to flexure. However, the Federal Cement Tile Company, after extended experiments, has been able to produce a Haydite concrete of somewhat greater weight but of a strength comparable with the better grades of concrete made with sand and stone aggregates; in fact, some test specimens have developed a strength of 4,000 lb. per sq. in. in 28 days. The mix used, together with the mechanical agitation of the forms during pouring, have been effective in obtaining a dense concrete and a particularly smooth finish on the under side, with the result that, when tested for absorption of water through the lower face, the slabs show about the same permeability as slabs made of ordinary aggregates. (These slabs are intended for use where the upper surface is covered with composition roofing.)



A Federal Haydite Roof Slab

The Featherweight slabs, as they are known, conform in form and general dimensions to those made of ordinary concrete by the same manufacturer. The standard slab is 24 in. wide and 1 in. thick and has ribs 2¾ in. deep on each edge. There is a reinforcing bar in each rib and the web is reinforced with wire mesh. This construction is designed for a working load of 60 lb. per sq. ft. for spans up to 6 ft. 8 in. For longer spans, the weight is somewhat greater as deeper ribs are necessary.

* * *

On the German State Railways

Looking Backward

Fifty Years Ago

The Supreme Court of West Virginia has upheld the state in an indictment of the Baltimore & Ohio for "Sabbath breaking", in which it was alleged that the railroad transported coal over its lines on Sundays and otherwise performed labor that was not in the household or connected with work of necessity or charity.—*Railway Age,* September 11, 1879.

After a fight in the city council, the Chicago & Western Indiana has been granted permission by the City of Chicago to establish a right of way from the city limits to the business section of the city. The company was formed on June 6 for the purpose of leasing its road and terminal facilities to other companies. The roads mentioned as possible lessors include the Chicago & Eastern Illinois, the Wabash, and the Grand Trunk.—*Railway Age,* September 11, 1879.

The president of the Texas & Pacific, in his annual report, stresses the need of completing the construction of that road, not only as a transcontinental line, but also as a means of opening up trade with Mexico via El Paso. "Such a line of railway," the report continues, "will enable the merchants of the United States to compete successfully for the trade and commerce of a population of upward of 9,500,000 people that are now supplied almost entirely from England, Germany and France, via the Gulf and Pacific ports. It is estimated that within five years of the completion of this line to El Paso, the trade and commerce that will be exchanged between this country and Mexico will more than equal the present through traffic from the Pacific Coast."—*Railroad Gazette,* September 12, 1879.

Twenty-Five Years Ago

L. W. Landman, general traveling freight agent of the passenger department of the Hocking Valley at Detroit, Mich., has been appointed general agent of the passenger department of the Cleveland, Cincinnati, Chicago & St. Louis and the Michigan Central at Toledo, Ohio.—*Railway Age,* September 16, 1904.

At the twenty-second annual convention of the Roadmasters' and Maintenance of Way Association at the Transportation Building of the Louisiana Purchase Exposition at St. Louis, Mo., on September 13, it was noted that the average weight of locomotives exhibited at St. Louis had increased 50 per cent over the weight of those shown at Chicago 11 years before. The jury of railroad exhibits in the transportation department express the opinion, as did the corresponding body at the Chicago fair, that the limit of weight has been reached. —*Railway Age,* September, 1904.

Ten Years Ago

For the first time in the history of American railroads, representatives of a large proportion of the maintenance of way employees have assembled in one labor organization. Nearly 2,000 delegates are now in attendance at a convention of the United Brotherhood of Maintenance of Way Employees and Railway Shop laborers which convened at Detroit on September 9.—*Railway Age,* September 12, 1919.

The railroad shop employees affiliated with the American Federation of Labor have voted 325,000 to 25,000 to authorize their officers to call a strike to enforce their original demands for a general increase in wages from 68 to 85 cents per hour rather than accept the offer recently made by President Wilson. On September 5, the employee officers prepared to accept the offer of a readjustment increase of from 4 to 7 cents per hour.—*Railway Age,* September 12, 1919.

Communications and Books

Apprentice Training

OMAHA, NEB.

TO THE EDITOR:

With reference to the interesting editorial on apprentice training in your August 10 issue.

It is indeed true that the committee report on apprentice training at the Mechanical Division Meeting at Los Angeles, failed to bring out any information as to the possibilities of modernizing apprentice instructional methods to keep pace with other shop modernization programs.

Modernized railroad apprentice training makes use of the principle of individual instruction in order to solve the problem of the handling of apprentices in different stages of their training program scattered over ten or more craft classifications. Such modernized training has already provided definite craft instruction for the limited groups of apprentices in highly specialized crafts. Such modernized training also provides for just as efficient instruction of the small group of apprentices at outside points as is provided for the large groups at main shop points.

The cost of such training is figured as accurately as that of any other shop process and as a result of modernization has cut the total apprentice training cost over traditional methods more than half.

Such a training program also has sufficient elasticity to take care of any extra-curricular activities which are deemed practical in accordance with the location and size of the group affected.

Had there been no development in apprentice training methods during the past few years, the report should at least have pointed out the need of modernization. The fact that there have been modernized apprentice training programs in effect on several important railroads for several years makes it seem even more regrettable that more complete information was not presented in the report.

D. C. BUELL.

New Book

A New Era for British Railways, by Howard C. Kidd. 158 pages, 5½ in. by 8½ in. Bound in Cloth. Published by Ernest Benn, Ltd., Bouverie House, London, E. C. 4, England. Price 7s. 6d.

Consolidation, or rather amalgamation, of railways into a limited number of systems was not actively advocated in Great Britain until after the American Transportation Act, favoring a similar policy for the American railways, had become a law. Britain's Railway Act, embodying the amalgamation plan, was enacted in August, 1921. Sixteen months later the process of amalgamation was virtually complete and in October, 1923, the Amalgamation Tribunal, which supervised the process, disbanded—its work at an end. Meantime in the United States, after nine years, the program of consolidation is still in the stage of discussion.

Granting the enormous complexity of our problem, as compared with that of the British, their accomplishment cannot be minimized. Whether consolidation is a wise policy or not need not enter into the question of the magnitude of the task and the rapidity with which it was carried into effect. Whether or not American railroads will ever undergo such wholesale consolidation, nevertheless full acquaintance with what Britain has done should prove useful to Americans concerned with a problem of similar character.

This knowledge is not only useful, but Professor Kidd has presented it in a form which arouses lively interest. An American, a member of the faculty of the University of Pittsburgh, the author is thoroughly familiar with the consolidation problem in the United States and, thus, in describing the situation in Britain is able to make perfectly clear the dissimilarities as well as points of resemblance. This characteristic of Professor Kidd's work makes it, for the American reader, propably the most practical and easily understood treatment of the subject available. Moreover, it is brief, without to that end omitting any essential information, and the reader may assimilate its useful and interesting message in, at most, a couple of hours.

There are five chapter headings as follows: The Passing of the Railways Act; the Need for Railway Econcmies; the Plan of Railway Grouping; the Process of Amalgamation; and the Economies of Amalgamation. Particular attention should, perhaps, be called to this last chapter which gives the available evidence regarding the degree of accomplishment, which offers the only logical motive for attempting such a gigantic task as amalgamation. There have undoubtedly been economies, but many which were to be expected have yet to materialize—possibly due in large part to the legal provision that surplus employees may not be dropped from the payrolls without indemnification.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Rate-Making for Common Carriers, by J. Haden Alldredge. "It has been the purpose of the author to limit this book to a discussion of the principles, rather than the mechanics, of rate-making . . . Only those principles that have been recognized as legitimate and persuasive in dealing with this complicated subject are discussed. . . "p. v. 201 p. Pub. by The Harrison Company, Atlanta, Ga., $5

The Red Napoleon, by Floyd Gibbons. A provocative story of the "next world war" written in swinging style by a man who has been war correspondent in the last several wars. The use of railroads and other forms of transport as described in this book may occasion more than a little argument. 475 p. Pub. by Jonathan Cape and Harrison Smith, New York City. $2.50.

The Secretary's Handbook: A Manual of Correct Usage, by Sarah A. Taintor and Kate M. Munro. How to write letters instead of undistinguished communications, preparation of form letters, and of manuscripts, proof-reading and the compilation of bibliographies and indexes are discussed in this helpful book. 372 p. Pub. by The Macmillan Company, New York City. $3.50.

Periodical Articles

An Early American Locomotive, by H. H. Suplee. The "Mercury" built by Harrison and Eastwick in 1842. Illustrated. Mechanical Engineering, August 1929, p. 607-608.

Hungarian Railways, by Wm. A. Hodgman. "The Royal Hungarian Railways operate 7,040 kilometers of line, of which 2,703 kilometers are main line and 4,337 branch lines . . . [The Danube-Save-Adriatic Railway] is privately owned but receives subsidies from the State . . . The road comprises 408 kilometers of main line, 150 kilometers of sidetracks, and 227 kilometers of station sidetracks." Commerce Reports, September 9, 1929. p. 666-667.

Rail Unification Waits on I. C. C. Evils of Existing Situation Compel Action, by F. A. Korsmeyer. A review of proceedings, attitudes and problems. Barron's, September 2, 1929. p. 4-5.

Steam Generating Apparatus in Forest Areas as Related to Causes of Forest Fires, by A. C. Coonradt. "The Railroad Forest Protection Conference" p. 600-601. "Fire-prevention Equipment for Locomotives" p. 601-603, with two figures. Mechanical Engineering, August 1929, p. 599-604.

Odds and Ends of Railroading

Philatelist

Arthur F. White, statistician in the president's office of the Southern Pacific, is also a well known stamp collector. Two of his prizes are from Alaouits, a province of Syria, and La Aguera, a Spanish settlement ten miles square on the coast of Africa.

A Permanent Candidate

A. L. Baringer, extra clerk on the Indianapolis division of the Pennsylvania, is running for re-election as town clerk and treasurer of Crothersville, Ind. Mr. Baringer has held his municipal position for the past six years, and is running for his seventh term on the Citizens' ticket. This work is carried on in addition to his duties as a P. R. R. clerk, and involves the collecting and expenditures of the town's funds.

Aviator Gets New Experience

John A. Collings, superintendent of the Eastern division of the Transcontinental Air Transport at Columbus, Ohio, has experienced all the thrills connected with aviation. To reach this goal would suffice for the average man, but not for Mr. Collings. The one unsatisfied desire of his life was to experience the thrill of riding in the cab of a locomotive attached to a fast through passenger train. He did so recently and reported his experiences as novel. He was thrilled by the speed of the train, which apparently was greater than in air travel. Objects are so far away from a high-flying plane that much of the feeling of speed is lost.

A Habitual Soldier

Raymond Horton, brakeman for the Pennsylvania, has acquired the habit of going to war. At the age of 16 he enlisted in the Michigan militia. He served until October 1, 1897, and reenlisted on May 16, 1898, serving in Cuba. After being mustered out, he enlisted again on August 2, 1899, for service in the Philippines, but never got there. During the Mexican border troubles, he again enlisted, on June 1, 1915, and served until October 17, 1916. During the World War he tried to enlist again, but wasn't accepted, so he went to Canada and joined the expeditionary force there, serving overseas, and being discharged at Montreal on March 24, 1919. He is now awaiting another war.

Runs One Train 167,000 Miles

J. M. (Uncle Bud) Smith of Clarendon, Ark., has issued a challenge to every railroad man in America to equal his 47 years of service with one 50-mile road. While in a mood for statistics "Uncle Bud" recently figured he had run his engine more than 167,000 miles over the 50-mile line from Helena to Clarendon. He began his employment with the road as a fireman at the age of 21 and three years later was made engineman. He has worked a total of 17,250 days for the road. He estimates he has used enough steam in blowing the whistle to carry the train once around the world. The road was known as the Arkansas Central when he began working for it. Later it was changed to the Arkansas Midland, and is now a part of the Missouri Pacific.

The Soviet and the Railway Experts

Two railway experts employed by the Soviet transport system—MM. von Meck and Velichko—having first been declared bandits and shot without trial by the Ogpu, have now been charged with a most amazing series of crimes. In brief, they are accused of having striven to foment discontent against the Soviet authority by creating a transport crisis, to which end they are said to have directed the capital of the railways into wrong channels, attempted to disorganize the work of repairing rolling stock and transporting grain, planned the utilization of unduly heavy equipment at exorbitant cost, and attempted to propagate views in the technical press calculated to corrupt the "ideology" of other specialists. Last, but certainly not least, they are charged with devising and constructing a special type of railway carriage for the purpose of causing train-sickness and creating discontent among the travelling public. As neither of the accused officials lived to meet the charges against them, the Soviet authority would seem to have lost an opportunity for instituting a species of trial by ordeal which should have made a special appeal to the mentality of Moscow; but we may, on the other hand, be pardoned for entertaining a shrewd suspicion that even the charge of designing a train sickness carriage paled before the grosser crime attributed to M. von Meck, who was it appears, the former chairman of the Moscow-Kazan Railway—and hence of the hated bourgeoisie! The whole affair is one of unrelieved tragedy, which even the vast possibilities of a train-sickness special are powerless to lighten. —Modern Transport.—London.

The Truth At Last

What once was hailed as a great act of heroism in routing a band of train robbers has been explained here as an accident on the part of a railroad fireman. The de-bunker of the hero is the hero himself, "Jim" DeRoche, Pawhuska, Okla., police sergeant. Back in 1898, DeRoche was given wide credit for preventing the plundering of a Santa Fe train by dispersing Indian Territory desperadoes with a cloud of steam. DeRoche at that time was a fireman in freight service on the Santa Fe between Arkansas City, Kas., and Purcell, Okla. On this occasion he had caught an extra passenger run and was doing the scooping for Engineer "Jim" Phillips on southbound train No. 405—a pretty good train in those days with two mail cars, two express cars, two chair cars and a sleeper.

"White Eagle, down in Oklahoma Territory, was our first stop for water after leaving Arkansas City," DeRoche recalled. "The engineer had spotted the engine at the tank and I was on the tender when some one stuck a revolver in my ribs and I saw four or five men crawling up. The robbers talked in broken English and I guessed they were Indians or part Indians.

"I had heard of men being shot just for their tobacco in 'the strip' and I was plenty scared. They ordered me off the tender and up to the cab. In haste to obey, one of my feet struck the water glass which stuck out on the boiler-head. It broke. We were carrying 240 pounds of steam and there was a great hissing and the cab filled with steam and scalding water.

"The robbers apparently believed the engine was blowing up and began scattering. The engineer thought I had broken the glass just to scare the bandits and as soon as they hopped from the engine he yanked on the throttle. Several others in the band had been trying to make the brakeman uncouple the engine. They followed their comrades in flight and the brakeman swung on the first chair car as we pulled out. Across the river we stopped and put in a new water glass. Then we continued the trip into Purcell uneventfully.

" 'That was a great idea for getting away from them,' the engineer called over to me. 'How did you happen to think of it?'

"My fright was gone then and my chest began to swell a little. 'That was nothing,' I answered. 'It just occurred to me that it might work.'

"News of the attempted robbery had been telegraphed ahead and I was hailed as a hero at Purcell. When I started the trip there were 60 'brownies' (black marks under a demerit system which meant automatic dismissal from service when 100 had been assessed) against my record. These were wiped off and I was given 60 merit marks."—Kansas City Star.

NEWS *of the* WEEK

On the Central Vermont Near Swanton, Vt.

As a Result of the St. Louis-San Francisco's effort to promote the beautifying of its property, 900 flower plots have been cultivated this year in nine states by section foremen, agents and crossing watchmen. During this period of eight months the railway distributed 7,000 packages of seeds, 20,000 bulbs, 25,000 shrubs and 60,000 bedding plants free of charge to men who asked for them, with the understanding that the flower plots be maintained by the men themselves. Two gardens at St. Mary's, Mo., were awarded the first prize of $15. They were 100-ft. by 300-ft. and 50-ft. by 100-ft., in area, contained 50 varieties of flowers and were cared for by the Frisco agent at this point and the mayor of the city.

Wage Statistics

The number of employees reported by Class I railways as of the middle of June was 1,736,196, and the total compensation was $245,765,210, according to the Interstate Commerce Commission's monthly compilation of railway wage statistics. Compared with the returns for the corresponding month of last year, the summary shows an increase of 0.03 per cent in the number of employees and an increase of 1.99 per cent in their total compensation.

Group Life Insurance for Pullman Employees

The Pullman Company has entered into an agreement with the Prudential Insurance Company of America, whereby approximately 30,000 of its employees are protected under a group life insurance plan. In addition to life protection, the policy provides benefits in the event of injury or sickness. All premiums for the month of September are being paid by the Pullman Company. Thereafter the employees themselves will pay part of the premiums.

The policy provides insurance in varying amounts, according to the position held by the employee, and it covers all classes of employees, including those of the general and district offices, conductors, porters, commissary workers, laundry workers and car repairmen.

In June, 1928, a Prudential group policy was issued to cover approximately 4,000 persons comprising the personnel of the Pullman Car and Manufacturing Corporation.

Airplane Disaster in New Mexico

"The City of San Francisco" westbound transport airplane of Transcontinental Air Transport, was wrecked on Tuesday, September 3, about 26 miles west of Gallup, N. M., and the five passengers and the crew of three men were killed. Extensive search by 15 airplanes and numerous scouting parties on the ground failed to locate the fallen airplane until after four days.

The cause of the disaster has not been explained. An officer of the company expresses the belief that the plane struck the ground on the side of a mountain at full speed, the pilot not having shut off the power.

A New Consolidation Map

A detailed and comprehensive map of the railways of the United States, portraying the so-called Ripley plan of consolidation, has been published in color by Edward Aberle, 671 Broad Street, Newark, N. J. The size of the map is 28 in. by 42 in. and has been lithographed in eight colors. An alphabetical index of the roads, as well as a chart showing the proposed groupings and individual systems, is a feature, colors being used to differentiate between the various groupings.

Illinois Central Passenger Terminal at New Orleans

The Louisiana Public Service Commission, in a report issued on August 31, has approved the general plans of the Illinois Central providing for a new passenger terminal in New Orleans, a headhouse station fronting on Rampart street. Preliminary plans and conditions are discussed in the report, but the railroad company is given 120 days in which to file final and detailed plans. The commission has committed itself to the proposition of two union stations in New Orleans, one above Canal street and the other below, the difficulties and cost of establishing a single union station being regarded as substantially insurmountable.

The Roadmasters' Convention

The Roadmasters and Maintenance of Way Association will hold its 47th annual convention at the Hotel Stevens, Chicago, on September 17-19, with the following program:

Tuesday, September 17

10:00 a. m. Convention called to order.
10:15 a. m. Opening address by W. F. Thiehoff, general manager, Chicago, Burlington & Quincy.
10:40 a. m. Address by President H. R. Clarke.
11:00 a. m. Report of committee on The Training and Selection of Track Foremen, G. T. Donahue, chairman, assistant division engineer, New York Central.
2:00 p. m. Address on Recent Developments in the Detection of Transverse Fissures in Rails, by Chas. W. Gennet; Jr., vice-president, Sperry Rail Service Corporation, Chicago.
2:45 p. m. Report of committee on The Detection and Correction of Unsafe Methods in Track Work, G. H. Warfel, chairman, assistant to general manager, Union Pacific, Omaha.
3:30 p. m. Address on The Stabilization of Maintenance of Way Forces, by H. S. Clarke, engineer maintenance of way, Delaware & Hudson.
4:30 p. m. Adjournment to visit exhibit of Track Supply Association.
8:00 p. m. Moving pictures illustrating modern methods in track work.

Wednesday, September 18

9:30 a. m. Report of committee on Costs of Weeds Control and Elimination, A. Chinn, chairman, district engineer maintenance of way, Chicago, Burlington & Quincy, Lincoln.
10:30 a. m. Address on The New Day in Maintenance, by R. H. Ford, assistant chief engineer, Chicago, Rock Island & Pacific.
11:30 a. m. Address on The Production and Care of Cross Ties, by R. S. Belcher, manager treating plants, Atchison, Topeka & Santa Fe.
2:00 p. m. Report of committee to Develop Standards of Good Workmanship in Laying Rails and Recommend Methods of Insuring Adherence to Those Standards, C. W. Baldridge, chairman, assistant engineer, Atchison, Topeka & Santa Fe.
3:00 p. m. Address on Getting the Most from Labor Saving Equipment, by M. M. Backus, assistant chief engineer maintenance of way, Illinois Central.
4:00 p. m. Adjournment to visit exhibit of Track Supply Association.
6:30 p. m. Annual dinner of the Track Supply Association and the Roadmaster's Association. Address by L. A. Downs, president, Illinois Central.

Thursday, September 19

9:30 a. m. Report of committee on Methods of Determining and Controlling Cross and Switch Tie Renewals, L. M. Denny, chairman, supervisor, Cleveland, Cincinnati, Chicago & St. Louis.
10:30 a. m. Business session.

On Thursday afternoon the members will visit the plant of the Inland Steel

Company to observe the rolling of rails, joints and tie plates and the making of bolts and spikes.

Centenary of Old Portage Railroad

The Old Portage Railroad from Hollidaysburg, Pa., westward over the Allegheny mountains, to Johnstown, was begun 100 years ago, and the Commonwealth of Pennsylvania, which built the road, has erected a monument celebrating the event, which will be dedicated on Tuesday, October 1, at 3 p. m. The monument is at the foot of Plane Six on the William Penn Highway, between Hollidaysburg and Cresson.

The monument has been erected by a commission appointed by the governor of the state, of which William Elmer, special engineer of the Pennsylvania Railroad (formerly superintendent at Altoona) is chairman; and invitations to the celebration have been issued by this commission. Special trains are to be run for the occasion over the Pennsylvania from Philadelphia and from Pittsburgh, and automobiles will take guests from Cresson to the monument.

The monument is to be unveiled by Jonathan Leet, great-grandson of Jonathan Leet, who at one time was canal supervisor, and an address will be delivered by Hon. Plymouth W. Snyder, of Hollidaysburg, former president of the Blair County Historical Society. Other speakers will be Charles M. Schwab, A. J. County and Governor John S. Fisher.

Following years of agitation, a board of commissioners to establish a canal from Philadelphia to Pittsburgh was created in 1824 by the legislature of Pennsylvania, and the Portage Railroad was a series of so-called "levels" and inclined planes to surmount the mountains where the commission decided that a canal was not feasible. Passengers and freight were carried from the eastern terminus to Columbia by cars drawn by horses. At Columbia they were transferred to canal boats for the journey to Hollidaysburg. There they were again transferred to cars and hauled by horses 3¼ miles to the foot of Plane 10, where a rope was attached and the cars were drawn up 2296 ft. by a stationary steam engine at the top. This plane lifted the cars 182 ft. at a speed of about four miles an hour. Planes of various length and steepness alternated with comparatively level sections to the top of the mountain (foot of Plane 6) and then the westward slope was descended in the same manner to Johnstown.

The completion of this road over the mountains at once reduced the cost of freight transportation from Hollidaysburg to Blairsville, 53 miles, from about sixteen dollar a ton to less than four dollars.

In 1835, a second track was completed over the Old Portage line, but the locomotive had already shown its adaptability to mountain transportation, and by July 1, 1855, the New Portage Railroad, with grades on which locomotives could operate, succeeded the old line. In the meantime, the Pennsylvania Railroad Company, chartered in 1846, had completed its line to Pittsburgh, and on July 31, 1857, it acquired the state works, which were sold at auction, and took possession of the line through from Philadelphia.

Canal boats built in short sections, which could be separated for transportation on cars, were put in use some years after the Old Portage road had been opened, and boats of that kind were loaded in Philadelphia and taken through over the mountain.

Seek Delay of N. Y. Constructive Station Order

The New York Board of Trade, in a letter dated September 10, has asked the Interstate Commerce Commission to postpone for a period of six months the effective date of the recent decision permitting carriers serving New York City to abolish constructive station service and constructive deliveries of freight through lighterage points.

In making this request of the Commission W. J. L. Banham, president of the New York Board of Trade, explains the action in the following manner:

"The New York Board of Trade does not seek to re-open the constructive station hearing. It is not passing judgment on the merits of the case so thoroughly reviewed by the Interstate Commerce Commission. It is not commenting adversely, or otherwise, on the decision reached. But we do feel that some lines of business in New York might be subjected to serious delays and higher trucking costs in fulfilling contracts made prior to the decision handed down. We appeal only for a six months delay which would allow reasonable time for business houses to adjust themselves to the new conditions, and to permit a longer period for the development of plans to move freight expediously to the City of New York. Prompt deliveries and rates are two vital essentials in business, and to avoid unnecessary disturbance of these two important factors the Board of Trade asks for a six months' suspension order."

The text of the letter addressed to the Commission is as follows:

"Your petitioner is the New York Board of Trade, a Corporation of the State of New York, which fosters the trade and commerce of the City and State of New York.

"It respectfully petitions your Honorable Commission to issue a suspension order postponing for a period of six months the recent decision to abolish constructive station deliveries to New York City.

"In presenting this petition the New York Board of Trade believes that it is acting in the interests of shippers and receivers of freight in this City, and that the order becoming effective September 25th, will impose hardships and burdens which are unnecessary.

"It is the opinion of this Board that serious delays will ensue in the delivery of freight in this City, and that many receivers of freight will be called upon to pay very much higher charges than under the existing system of constructive station delivery.

"The New York Board of Trade believes that if a six month period should be allowed plans may be developed for prompt and expeditious receiving of freight in this City under arrangements that will be satisfactory to the railroads and to the Commission.

"This application is made on order of the Executive Committee following a regular meeting held on Tuesday, September 10th."

N. Y. Universal Freight Station Experiment Approved

The committee of presidents of railroads serving New York City has informed the Port of New York Authority that "all railroads would make use of an experimental universal inland freight station after a satisfactory agreement as to terms of usage of the same by the railroads shall have been reached as between the Port Authority and the railroads."

This universal station will be the first of a proposed series of off-track freight facilities which the general plan of the Port Authority contemplates for Manhattan Island. This plan was urged by Port Authority witnesses at the Interstate Commerce Commission's hearings in connection with its investigation into freight trucking practices of New York carriers. The decision in this case, while permitting the discontinuance of constructive station service and abolishing constructive delivery through lighterage points, left the present off-track stations of the individual roads undisturbed (see *Railway Age*, August 24, page 467).

Following the foregoing assurance from the railroads of their disposition to cooperate the Port Authority announced that the new universal station will be available for railroad usage within 15 months. Preliminary plans have been prepared and a site selected. The site, of which 60 per cent has been acquired, is on the west side of Manhattan between Canal and Twenty-first streets. The building, according to the announcement, will occupy an entire block about 200 ft. wide and 800 ft. long. It will be fourteen stories in height above the street, with a basement and sub-basement. The construction will be of reinforced concrete with brick veneer, terra cotta ornamentation and granite base, modern, fire-proof and fully sprinklered, with adequate provisions for power and light requirements and large window openings. The basement will be used exclusively for freight facilities of the operating railroads. The central portion of the street floor (removed from the main avenues) will be used as an inbound and outbound freight station, with all standing trucks within the building lines.

The Port Authority announced the action of the railroads as follows:

"The presidents of the New York Railroads, at a meeting held in this city yesterday, considered report of its sub-committee appointed more than one year ago to conduct such investigations, in coopera-

tion with the Port of New York Authority, as might be necessary to determine as to the desirability of the railroads employing as one means of handling freight in New York, universal inland freight stations.

"Report of the committee of the presidents embraced recommendations reading:

"'First: That railroads willing to use inland freight stations for the handling of less-car-load non-perishable merchandise freight advise the Port of New York Authority that if it will construct an universal inland freight station as proposed, and have it ready for use within approximately one year, such railroads will use it in accordance with an appropriate agreement in which shall be set forth satisfactory conditions of usage, and a definite commitment on the part of the Port of New York Authority to construct two additional universal inland freight stations if, and when desired by the railroads, and

"'Second: That investigations pertaining to an Optional Collection and Delivery Service Plan be concluded as quickly as practicable but action contemplating adoption of such a plan be deferred pending decision of the Interstate Commerce Commission in connection with Docket I. C. C. 19715.'

"These recommendations, which were the result of the series of investigations extending over the period of more than one year, were adopted unanimously by the Presidents' Conference Committee and its sub-committee was authorized so to inform the Port Authority, and additionally, that all the railroads would make use of an experimental universal inland freight station after a satisfactory agreement as to terms of usage of same by the railroads shall have been reached as between the Port Authority and the railroads."

Railway Earnings for July

Class I railroads for the first seven months this year had a net railway operating income of $685,508,192 which was at the annual rate of return of 5.57 per cent on their property investment, according to reports filed by the carriers with the Bureau of Railway Economics. In the first seven months of 1928, their net was $557,646,004, or at the annual rate of 4.60 per cent.

Operating revenues for the seven months totaled $3,621,824,472, compared with $3,426,180,240 for the same period last year or an increase of 5.7 per cent. Operating expenses amounted to $2,635,807,627, compared with $2,585,599,838 for the same period one year ago or an increase of 1.9 per cent.

Class I railroads in the seven months paid $232,510,721 in taxes, compared with $215,505,500 for the same period the year before. For July alone, the tax bill of the Class I railroads amounted to $35,661,914, an increase of $2,928,889 over the previous year.

Sixteen Class I railroads operated at a loss during the first seven month period of 1929.

The net railway operating income by districts for the first seven months of 1929, with the percentage of return based on property investment on an annual basis was as follows:

New England Region	$ 29,082,871	5.96%
Great Lakes Region	122,095,723	5.27%
Central Eastern Region	164,820,155	6.09%
Pocahontas Region	49,548,555	8.92%
Total Eastern District	365,547,304	6.02%
Total Southern District	77,366,890	4.31%
Northwestern Region	68,786,846	5.28%
Central Western Region	119,822,932	5.87%
Southwestern Region	53,984,220	4.95%
Total Western District	242,593,998	5.46%
UNITED STATES	685,508,192	5.57%

Class I railroads for July had a net operating income of $122,782,807 which, for that month, was at the annual rate of 5.73 per cent. In July last year, their net was $95,230,577 or 4.51 per cent. Operating revenues for July amounted to $557,568,041, compared with $513,730,126 in July last year, or an increase of 8.5 per cent. Operating expenses in July totaled $389,261,547, an increase of 3.5 per cent.

In the Eastern District for seven months the net was $365,547,304 at the rate of 6.02 per cent. For the same period in 1928, their net was $292,523,851 or 4.90 per cent. Operating revenues for the seven months totaled $1,817,424,673, an increase of 6.8 per cent, while operating expenses totaled $1,308,386,517, an increase of 2.7 per cent. Class I railroads in the Eastern District for July had a net of $61,162,018 compared with $48,471,795 in July, 1928.

In the Southern District for the first seven months the net was $77,366,890, at the rate of 4.31 per cent. For the same period of 1928, their net amounted to $70,670,890, at the rate of 4 per cent. Operating revenues for the seven months amounted to $454,554,701, an increase of 1.4 per cent while operating expenses totaled $342,318,418, a decrease of one-half of one per cent. The net in July amounted to $8,475,206, while in the same month in 1928 it was $8,263,091.

In the Western District for the seven months the net was $242,593,998, at the rate of 5.46 per cent. For the first seven months in 1928, the railroads in that district had a net of $194,451,263, at the annual rate of 4.43 per cent. Operating revenues for seven months amounted to $1,349,845,098, an increase of 5.8 per cent, while operating expenses totaled $985,102,692, an increase of 1.8 per cent. For July, their net amounted to $53,145,583, as compared with $38,495,691 in July, 1928.

CLASS I RAILROADS—UNITED STATES

	Month of July	
	1929	1928
Total operating revenues	$ 557,568,041	$ 513,730,162
Total operating expenses	389,261,547	376,043,728
Taxes	35,661,914	32,733,025
Net railway operating income	122,782,807	95,230,577
Operating ratio—per cent	69.81	73.20
Rate of return on property investment	5.73%	4.51%
	Seven months ended July 31	
Total operating revenues	$3,621,824,472	$3,426,180,240
Total operating expenses	2,635,807,627	2,585,599,838
Taxes	232,510,721	215,505,500
Net railway operating income	685,508,192	557,646,004
Operating ratio—per cent	72.78	75.47
Rate of return on property investment	5.57%	4.60%

Exhibit at M. C. B. & S. Convention

A total of 46 railway supply companies were represented at the exhibition held in connection with the annual convention of the Master Car Builders' and Supervisors' Association at the Hotel Sherman, Chicago, September 4 to 6, inclusive. At the regular annual meeting of the supply association, the following officers were elected for the ensuing year: President, J. T. Cralley, Union Metal Products Company, Chicago; first vice-president, C. F. Weil, American Brake Shoe & Foundry Company, Chicago; second vice-president, E. H. Hall, Milar, Clinch & Company, St. Louis; third vice-president, K. M. Hamilton, The Bettendorf Company, Chicago; fourth vice-president, Karl Milar, Milar, Clinch & Company, Chicago; secretary-treasurer, Bradley Johnson, W. H. Miner, Inc., Chicago. The board of directors consists of J. W. Fogg, MacLean-Fogg Lock Nut Company, Chicago; R. H. Miner, W. H. Miner, Inc., Chicago; E. H. Weaver, Westinghouse Air Brake Company, Chicago; F. E. Dodge, National Lead Company, New York; C. C. Kinsman, Universal Draft Gear Attachment Company, Chicago; A. N. Lucas, Oxweld Railroad Service Company, Chicago; J. H. Schroeder, Union Metal Products Company, Chicago; C. V. Broadley, American Steel Foundries, New York.

The companies represented, products on exhibition and representatives in attendance were as follows:

Allegheny Steel Company, Brackenridge, Pa.—Journal-box lids and brake shoes (composition). Represented by H. S. Brautigam and A. M. Smith.

American Steel Foundries, Chicago.—Models of radial coupler, roller-bearing units, cast-steel truck, adjustable-head passenger brake beams, vertical-key coupler yokes and reversible-fulcrum freight brake beams. Represented by W. G. Wallace, W. A. Stearns, D. Light, C. V. Broadley, C. E. Grigsby and W. C. Walsh.

Barco Manufacturing Company, Chicago.—Engine and tender metallic connections, metallic steam-heat car and rear tender connections and lubricated plug valves. Represented by W. J. Behlke, Jr., and C. O. Jenista.

Bettendorf Company, Bettendorf, Ia.—No exhibit. Represented by K. M. Hamilton.

Boss Bolt & Nut Company, Chicago.—Lock nuts, carriage bolts, machine bolts and lag screws. Represented by H. Burns, J. P. Crowley, C. C. Hopkins, I. F. Gross, R. Shanahan and G. Hanley.

Carrington Cabell, Inc., St. Louis, Mo.—Lock-tite pins. Represented by Carrington Cabell and J. E. Whalen, Jr.

Chicago Pneumatic Tool Company, Chicago.—Air and electric tools and compressors. Represented by H. R. Deubel, R. N. Nolan and L. F. Duffy.

Dayton Pneumatic Tool Corporation, Dayton, Ohio.—Safety nail driver, riveting and clipping hammers, hose connections and rivet buster. Represented by W. B. George.

Detroit Graphite Company, Detroit, Mich.—Primer for galvanized roofs, pipe joint cement and car floor sealer. Represented by W. D. Waugh, L. D. Mitchell and L. F. Flanagan.

Paul Dickinson, Inc., Chicago.—Cast-iron caboose and camp-car jacks, cast-iron exhaust heads and ventilators. Represented by A. E. Engman and W. C. Schalm.

The Duff-Norton Manufacturing Company, Pittsburgh, Pa.—Power jacks of all types combining air and manual operation. Represented by E. Thulen, D. Evans and J. Gilchrist, Jr.

Duntley Dickinson Supply Company, Chicago.—No exhibit. Represented by J. C. Campbell and W. J. Dickinson.

Gold Car Heating and Lighting Company, Brooklyn, N. Y.—Vapor regulator, new type inlet supply valve, 90-deg. end valve, steam-hose coupler, automatic wash basin, hot-water supply for coaches and private cars, and fin tubing. Represented by R. L. Belknap, A. D. Stuver and J. T. Smith.

Grip Nut Company, Chicago.—Lock nuts. Represented by J. H. Sharp, T. M. Mullinix, E. H. Woods and L. W. Kass.

Hays Corporation, Michigan City, Ind.—Win-

(Continued on page 660)

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1929

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Akron, Canton & Youngstown	July	171	$317,976	$139	$331,661	$58,185	$20,021	$14,024	$76,760	$18,502	$187,492	56.5	$144,169	$122,702	$95,481	$63,278
	7 mos.	171	2,248,993	985	2,336,512	294,255	185,815	96,952	551,400	125,013	1,251,857	53.6	1,084,655	928,775	694,068	352,561
Atchison, Topeka & Santa Fe	July	9,392	16,332,581	3,343,954	21,241,973	3,008,966	3,337,858	415,989	5,336,994	447,842	12,489,573	58.8	8,752,400	6,841,365	6,615,306	5,067,924
	7 mos.	9,392	89,403,786	21,145,118	123,367,202	18,989,947	23,203,922	2,888,105	34,685,023	3,166,698	82,808,153	67.1	40,559,049	30,017,777	30,131,129	17,894,539
Gulf, Colorado & Santa Fe	July	1,944	2,643,894	192,067	2,964,763	410,641	519,961	58,513	787,348	75,924	1,840,990	62.1	1,123,773	1,035,116	839,593	601,019
	7 mos.	1,944	13,309,941	1,222,487	15,685,646	3,638,788	3,150,719	395,598	4,885,307	518,808	12,501,063	79.7	3,184,583	2,550,486	1,712,009	1,024,211
Panhandle & Santa Fe	July	1,104	1,511,356	98,932	1,696,724	162,648	256,042	13,589	429,113	27,622	758,042	44.7	938,682	829,446	698,018	483,125
	7 mos.	1,058	6,688,190	639,956	7,957,164	1,595,528	1,426,122	87,301	2,240,168	192,313	5,384,014	67.7	2,573,150	2,224,814	1,631,558	482,076
Atlanta & West Point	July	93	162,918	48,996	241,963	44,182	43,599	12,796	88,377	12,578	206,492	85.3	35,471	22,710	9,660	24,822
	7 mos.	93	1,114,751	342,336	1,689,149	227,486	300,221	87,916	650,093	96,134	1,394,523	82.6	294,626	197,219	108,069	186,627
Western of Alabama	July	133	171,675	52,050	246,789	66,011	49,196	13,534	72,146	12,725	218,086	88.4	28,703	15,586	21,620	62,015
	7 mos.	133	1,188,711	366,313	1,742,307	337,388	349,605	90,228	578,880	96,709	1,481,374	85.0	260,933	159,173	178,996	493,545
Atlanta, Birmingham & Coast	July	639	352,778	27,858	473,873	88,116	81,964	25,052	168,475	18,053	392,778	82.9	81,095	64,211	50,474	38,192
	7 mos.	639	2,283,831	148,867	2,778,560	614,261	576,635	198,392	1,100,505	131,046	2,697,041	97.1	81,519	—36,536	—129,826	—143,150
Atlantic Coast Line	July	5,152	3,235,886	675,507	4,385,211	830,326	1,189,503	142,124	1,851,410	171,130	4,215,797	96.1	169,414	—132,149	16,734	168,525
	7 mos.	5,150	34,436,515	8,560,161	47,226,726	6,155,496	8,120,778	1,148,680	15,111,643	1,242,845	32,212,010	68.2	15,014,716	10,999,626	10,433,397	6,605,639
Charleston & Western Carolina	July	342	228,351	11,198	249,011	53,970	39,151	5,683	89,854	7,808	196,364	78.9	52,647	26,087	28,572	24,705
	7 mos.	342	1,804,852	69,198	1,949,492	423,431	269,108	49,139	679,331	49,531	1,470,431	75.4	479,061	308,476	289,544	216,951
Baltimore & Ohio	July	5,639	17,451,081	2,001,147	22,162,117	2,878,731	4,320,035	505,199	6,850,934	739,395	15,492,151	69.9	5,669,966	5,604,152	5,178,947	4,848,775
	7 mos.	5,639	117,773,766	13,036,890	141,457,069	16,851,130	30,085,251	3,487,596	48,081,393	4,858,455	104,664,211	74.0	36,792,858	29,545,300	27,669,787	22,561,135
Baltimore & Ohio Chicago Term.	July	82	.....	.....	400,327	53,181	43,403	2,193	176,490	16,809	293,083	73.2	107,244	39,012	151,933	120,516
	7 mos.	82	.....	.....	2,593,057	306,789	323,572	16,337	1,279,575	124,054	2,078,952	80.2	514,105	76,442	790,591	736,727
Staten Island Rapid Transit	July	23	Dr. 171,595	178,505	22,256	Cr. 25,505	14,724	2,040	110,987	16,657	118,903	534.3	—96,647	—113,647	63,102	57,186
	7 mos.	23	459,855	928,909	1,477,942	169,818	125,394	14,534	746,756	108,920	1,165,422	78.9	312,520	189,503	146,685	143,380
Bangor & Aroostook	July	619	294,826	33,158	356,850	119,035	108,008	6,244	120,413	25,362	381,863	107.0	—25,013	—49,003	—19,932	29,087
	7 mos.	619	3,914,118	357,192	4,598,272	755,851	841,646	42,087	1,130,290	193,603	2,981,102	64.8	1,617,170	1,250,019	1,339,508	1,295,714
Belt Ry. Co. of Chicago	July	48	.....	.....	706,500	69,600	70,924	3,421	280,881	11,895	436,721	61.8	269,779	209,976	166,603	137,982
	7 mos.	48	.....	.....	4,737,465	495,633	524,099	26,493	2,163,183	106,757	3,316,165	70.0	1,421,300	1,024,090	1,062,381	1,008,581
Bessemer & Lake Erie	July	227	2,220,087	7,856	2,343,919	287,485	348,765	13,681	383,927	35,807	1,073,612	45.8	1,270,307	1,098,007	1,067,276	884,257
	7 mos.	227	9,625,403	52,626	9,940,382	930,821	2,274,456	101,210	2,189,900	251,104	5,717,589	57.5	4,222,793	3,704,114	3,876,232	2,210,164
Bingham & Garfield	July	33	44,485	.....	47,202	8,350	5,472	1,755	11,458	4,168	31,317	66.3	15,885	7,004	23,432	20,706
	7 mos.	33	316,924	.....	334,587	54,312	32,526	11,217	74,893	30,932	204,964	61.3	129,623	31,962	151,187	107,144
Boston & Maine	July	2,077	4,315,436	1,582,729	6,789,154	1,417,209	904,315	113,544	2,242,079	229,818	4,942,498	72.8	1,846,656	1,501,497	1,280,750	1,262,726
	7 mos.	2,077	29,435,196	9,213,177	44,459,149	7,607,388	7,580,583	651,997	15,615,788	1,535,740	33,134,674	74.5	11,324,475	9,108,873	7,578,774	7,370,732
Brooklyn East. Dist. Terminal	July	11	118,520	.....	121,588	14,500	16,071	416	41,877	6,696	79,560	65.4	42,028	34,526	34,526	32,032
	7 mos.	11	829,072	.....	847,833	67,540	95,825	4,816	296,044	46,432	510,657	60.2	337,176	283,558	283,558	283,843
Buffalo & Susquehanna	July	253	117,351	848	129,218	30,382	50,938	2,138	38,778	7,730	129,966	100.6	—748	—2,848	10,543	20,092
	7 mos.	253	947,697	7,145	1,029,814	200,917	348,156	13,009	313,590	54,688	930,360	90.3	99,454	103,847	211,439	121,773
Buffalo, Rochester & Pittsburgh	July	601	1,325,786	78,737	1,454,510	199,949	421,809	32,984	525,317	43,209	1,223,769	84.1	230,741	180,741	214,020	234,028
	7 mos.	601	9,290,563	489,135	10,191,047	1,126,214	2,982,949	230,276	3,673,998	312,873	8,336,853	81.8	1,854,194	1,543,409	1,707,330	1,696,359
Canadian Pacific Lines in Maine	July	233	108,942	34,318	155,717	37,542	34,624	7,562	76,350	4,701	160,779	103.2	—5,062	—19,562	—29,787	—32,722
	7 mos.	233	1,583,440	233,096	1,905,845	396,548	388,275	49,191	843,780	29,176	1,706,970	89.5	198,875	97,375	—80,766	—84,269
Canadian Pacific Lines in Vermont	July	85	125,990	52,535	207,383	52,901	27,709	1,969	96,023	2,537	180,922	87.2	26,461	22,441	—13,817	—506,443
	7 mos.	85	839,262	248,523	1,253,941	282,596	224,566	12,923	667,790	16,521	1,203,833	96.0	50,108	21,968	—211,142	—1,014,331
Central of Georgia	July	1,944	1,560,556	284,495	2,056,003	257,655	361,706	74,033	779,195	85,228	1,566,653	76.2	489,350	353,097	363,778	400,794
	7 mos.	1,944	10,944,808	2,141,061	14,599,981	1,991,030	2,545,112	503,606	5,478,756	616,449	11,237,009	77.0	3,362,972	2,457,934	2,469,139	2,384,620
Central New Jersey	July	690	3,486,947	1,016,987	4,806,739	515,157	902,354	73,085	1,851,549	134,885	3,504,443	72.9	1,302,296	801,595	674,357	578,895
	7 mos.	690	25,461,531	5,112,953	32,881,488	3,208,916	7,171,875	428,687	12,624,958	917,837	24,560,011	74.7	8,321,477	5,573,246	4,562,563	4,786,339
Central Vermont	July	413	606,816	128,007	965,193	206,486	100,370	19,908	285,708	27,978	642,542	66.6	322,651	306,501	318,168	5,295
	7 mos.	413	3,898,173	708,667	5,274,894	1,000,116	682,998	125,652	2,031,386	179,788	4,034,359	76.5	1,240,535	1,129,478	1,132,385	—1,633,968
Chesapeake & Ohio	July	2,733	9,584,112	539,906	10,585,803	1,603,300	2,416,261	133,216	2,671,507	314,884	7,153,468	67.6	3,432,335	2,731,094	2,908,307	3,030,947
	7 mos.	2,730	65,877,364	3,733,392	72,569,534	10,857,145	16,522,183	942,407	18,655,182	2,032,834	49,146,807	67.7	23,422,727	18,540,030	19,881,152	17,776,424
Chicago & Alton	July	1,028	1,687,388	445,880	2,720,265	323,379	440,531	80,530	880,795	59,664	1,795,789	66.0	924,476	808,691	610,666	173,622
	7 mos.	1,028	11,435,547	3,196,692	16,672,025	1,807,581	3,636,357	538,039	6,133,940	426,132	12,650,507	75.9	4,021,518	3,243,363	2,014,721	1,015,291
Chicago & Eastern Illinois	July	946	1,662,547	265,112	2,398,143	309,376	425,567	83,334	748,738	73,909	1,655,512	69.0	742,631	596,839	448,157	145,189
	7 mos.	946	11,093,096	1,920,116	14,549,964	1,840,783	2,997,484	581,142	5,445,109	504,591	11,470,841	78.8	3,079,123	2,177,412	1,130,379	499,818
Chicago & Illinois Midland	July	131	222,543	4,371	235,170	46,675	54,973	17,686	70,310	16,503	206,018	87.6	29,152	21,217	16,814	28,413
	7 mos.	131	1,582,944	40,640	1,676,374	248,924	380,836	128,490	479,842	126,118	1,363,584	81.3	312,790	257,245	250,666	244,776
Chicago & North Western	July	8,466	10,323,742	2,310,218	15,562,270	2,038,350	2,398,360	273,541	4,753,703	393,285	9,928,136	63.8	5,634,134	4,722,231	4,459,020	2,586,321
	7 mos.	8,466	62,387,972	14,171,596	87,653,793	11,970,254	16,807,177	1,537,932	32,833,804	2,671,770	66,298,130	75.6	21,355,663	15,785,398	14,381,950	11,640,415

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Chicago, Burlington & Quincy	July	9,374	$10,591,312	$2,009,122	$14,132,040	$2,658,819	$2,457,146	$323,348	$4,323,460	$389,613	$10,259,824	72.6	$3,872,216	$2,875,539	$2,633,575	$1,890,995
	7 mos.	9,374	69,962,310	10,794,889	90,359,042	13,243,833	14,347,189	2,053,962	29,787,088	2,620,361	62,680,929	69.4	27,678,113	20,181,434	18,667,923	15,181,167
Chicago Great Western	July	1,495	1,805,728	255,902	2,271,864	346,623	364,804	83,535	821,845	59,040	1,680,632	74.0	591,232	501,143	350,281	143,653
	7 mos.	1,495	11,403,149	1,666,695	14,331,077	1,861,103	2,624,446	583,919	6,035,424	406,054	11,573,039	80.8	2,758,038	2,183,219	1,012,772	924,280
Chicago, Indianapolis & Louisville	July	650	1,176,990	141,498	1,463,088	167,140	304,914	40,489	494,269	37,193	1,051,528	71.9	411,560	318,413	210,046	191,875
	7 mos.	650	8,116,685	1,142,984	10,496,238	1,036,829	2,191,953	282,538	3,744,045	258,689	7,608,953	72.5	2,887,285	2,274,861	1,391,415	1,360,001
Chicago, Mil., St. Paul & Pacific	July	11,247	12,171,211	1,580,657	15,533,000	3,204,865	2,625,675	369,115	5,062,096	392,775	11,749,299	75.6	3,783,701	2,962,310	2,405,606	1,480,641
	7 mos.	11,249	76,689,455	9,790,450	96,415,124	16,997,967	18,133,100	2,242,191	35,007,389	2,656,789	74,527,054	77.3	21,888,070	16,470,157	13,033,170	13,250,817
Chicago River & Indiana	July	20	.....	.....	577,220	50,836	55,255	403	210,956	15,078	332,528	57.6	244,692	197,268	280,724	247,163
	7 mos.	20	.....	.....	4,046,851	327,866	377,926	3,919	1,487,200	104,419	2,301,330	56.9	1,745,521	1,456,376	2,047,742	1,857,294
Chicago, Rock Island & Pacific	July	7,548	10,390,070	1,503,068	13,132,326	1,925,846	2,272,006	272,682	4,416,227	353,020	9,296,172	70.8	3,836,154	3,158,415	2,557,351	2,306,911
	7 mos.	7,561	60,692,277	10,843,769	79,025,923	11,040,311	15,708,290	1,821,230	29,118,463	2,481,247	60,772,785	76.9	18,253,138	13,419,481	10,171,243	10,795,527
Chicago, Rock Island & Gulf	July	530	727,711	67,275	865,495	73,728	70,349	23,044	287,715	20,362	479,473	55.4	386,022	362,646	312,856	276,717
	7 mos.	530	3,655,663	458,700	4,485,890	462,911	433,560	149,094	1,486,510	133,137	2,684,585	59.8	1,801,305	1,624,850	1,360,846	865,466
Chicago, St. Paul, Minn. & Omaha	July	1,746	1,727,887	371,301	2,532,876	457,296	400,593	41,799	901,267	81,152	1,893,068	74.7	639,808	531,124	462,013	—104,060
	7 mos.	1,746	11,065,896	2,383,504	14,936,969	2,141,553	2,746,407	278,342	6,500,228	568,801	12,312,018	82.4	2,624,951	1,875,133	1,456,587	693,096
Clinchfield	July	309	510,327	14,469	534,597	63,947	136,046	20,591	115,816	18,901	354,497	66.3	180,100	105,076	144,818	207,911
	7 mos.	309	3,850,938	98,886	4,032,370	437,421	1,004,592	154,338	835,296	127,949	2,558,963	63.5	1,473,407	948,267	1,448,369	1,514,381
Colorado & Southern	July	1,035	698,814	120,082	907,665	214,585	226,921	18,012	333,096	40,654	837,764	92.3	69,901	1,510	—30,069	163,102
	7 mos.	1,035	5,275,995	628,199	6,508,053	1,128,607	1,491,246	113,333	2,335,768	294,110	5,390,726	82.8	1,117,327	626,065	469,063	519,387
Ft. Worth & Denver City	July	696	1,411,507	169,074	1,657,998	146,851	187,849	24,995	363,114	38,908	768,549	46.4	889,449	779,135	714,422	411,450
	7 mos.	696	5,566,171	963,234	7,005,808	939,585	1,152,186	161,720	2,071,670	279,088	4,630,400	66.1	2,375,408	1,973,284	1,842,547	1,659,505
Wichita Valley	July	271	116,077	8,426	130,349	24,180	9,854	.....	38,084	1,456	73,148	56.1	57,201	50,343	27,279	2,217
	7 mos.	271	697,831	60,693	800,230	155,431	59,534	127	268,912	11,473	492,432	61.5	307,798	256,305	105,221	173,647
Columbus & Greenville	July	167	106,615	16,057	130,411	36,772	15,869	2,806	47,167	10,837	113,451	87.0	16,960	15,560	4,988	—13,852
	7 mos.	167	817,946	111,997	1,000,712	250,668	121,889	25,474	361,990	82,001	842,018	84.1	158,694	136,959	58,478	—12,727
Conemaugh & Black Lick	July	23	126,607	.....	210,372	22,084	33,707	972	99,047	3,338	159,148	75.7	51,224	50,224	51,566	46,281
	7 mos.	23	676,307	.....	1,251,739	113,809	208,462	4,409	679,380	23,787	1,029,847	82.3	221,892	214,892	209,211	65,355
Delaware & Hudson	July	881	2,800,002	357,943	3,405,652	440,565	771,418	70,407	1,237,779	161,204	2,695,039	79.1	710,613	621,447	593,228	268,921
	7 mos.	881	19,884,694	1,783,297	23,418,256	2,898,823	5,560,662	397,648	8,733,411	1,139,433	18,784,821	80.2	4,633,435	4,009,138	3,945,814	2,896,992
Delaware, Lackawanna & Western	July	998	4,669,419	1,060,314	6,609,224	697,765	1,180,814	147,589	2,539,489	178,172	4,761,479	72.0	1,847,745	1,288,872	1,302,520	1,160,950
	7 mos.	998	34,837,935	6,448,476	47,087,438	4,596,478	8,433,578	1,010,430	18,451,442	1,251,852	33,988,654	72.2	13,098,784	9,159,159	9,187,914	8,104,425
Denver & Rio Grande Western	July	2,563	1,982,444	459,318	2,705,663	457,516	549,922	71,461	767,771	91,008	1,982,057	73.3	723,606	558,572	642,439	434,211
	7 mos.	2,554	14,535,798	1,965,327	18,179,727	3,034,522	3,736,734	442,500	5,323,720	634,680	13,410,090	73.8	4,769,637	3,572,080	4,111,880	2,794,349
Denver & Salt Lake	July	232	172,910	14,140	278,067	63,955	59,170	2,292	46,815	13,786	183,031	65.8	95,036	85,034	92,451	68,064
	7 mos.	232	1,633,248	126,194	1,955,627	438,015	468,047	14,588	327,248	88,833	1,330,863	68.1	624,764	554,743	610,395	625,217
Detroit & Mackinac	July	273	136,563	11,384	160,536	32,547	34,925	2,210	41,226	6,277	109,976	68.5	50,560	41,053	40,869	21,079
	7 mos.	273	798,915	74,055	957,814	175,561	216,232	15,434	289,342	44,147	718,194	75.0	239,620	183,752	196,109	90,530
Detroit & Toledo Shore Line	July	50	347,149	.....	351,486	42,324	37,113	49,791	88,936	26,015	244,179	69.5	107,307	76,776	20,342	41,490
	7 mos.	50	3,052,354	.....	3,104,095	279,538	253,912	221,173	732,473	128,800	1,615,894	52.1	1,488,201	1,235,185	640,872	667,511
Detroit Terminal	July	19	.....	.....	209,215	23,893	16,825	.....	85,411	4,196	130,325	62.3	78,890	58,817	59,510	57,773
	7 mos.	19	.....	.....	1,669,081	161,044	144,611	1	707,376	30,803	1,043,835	62.5	625,246	476,336	481,411	352,853
Detroit, Toledo & Ironton	July	495	1,337,359	3,351	1,362,821	178,285	168,199	10,203	298,538	32,361	685,393	50.3	677,430	610,123	550,045	155,225
	7 mos.	495	8,769,072	21,982	8,980,522	1,043,166	1,205,473	84,860	2,058,463	214,756	4,596,826	51.2	4,383,696	3,885,179	3,243,892	872,649
Duluth & Iron Range	July	269	1,029,556	4,321	1,177,203	107,172	109,125	1,495	203,444	22,017	443,253	37.7	733,950	637,207	640,058	536,560
	7 mos.	269	3,459,795	32,052	3,997,018	685,786	775,027	11,254	958,129	155,779	2,585,757	64.7	1,411,261	1,112,060	1,115,808	494,212
Duluth, Missabe & Northern	July	305	3,021,824	3,702	3,438,223	186,079	178,032	3,136	408,900	25,607	801,659	23.3	2,636,564	2,356,870	2,352,270	1,844,753
	7 mos.	306	9,570,590	27,500	10,902,833	954,553	1,285,846	20,917	1,820,353	163,661	4,245,113	38.9	6,657,720	5,336,560	5,316,084	3,063,049
Duluth, Winnipeg & Pacific	July	178	197,629	14,313	227,841	62,142	38,692	5,009	75,437	9,701	195,621	85.9	32,220	21,142	20,016	—2,050
	7 mos.	178	1,342,405	90,620	1,501,427	327,120	282,261	34,490	516,934	58,755	1,241,004	82.7	260,423	184,444	186,824	152,838
Elgin, Joliet & Eastern	July	453	2,216,753	5	2,427,098	227,546	365,384	15,717	754,852	58,435	1,419,906	58.5	1,007,192	870,540	653,348	295,353
	7 mos.	453	14,448,735	67	15,876,087	1,404,804	2,662,755	107,064	5,399,458	374,618	9,941,937	62.6	5,934,150	5,025,948	3,613,307	2,798,460
Erie Railroad	July	2,047	7,619,208	1,067,218	9,522,092	1,307,189	2,180,455	179,225	3,450,482	307,546	7,480,724	78.6	2,041,368	1,624,467	1,586,620	1,232,449
	7 mos.	2,047	53,503,131	5,955,791	65,160,370	7,481,856	15,283,969	1,279,482	24,589,075	2,121,052	51,080,474	78.4	14,079,896	11,020,877	10,701,054	8,597,470
Chicago & Erie	July	269	1,034,177	73,203	1,223,374	192,052	142,902	29,958	365,560	43,307	771,958	63.1	451,416	395,199	111,230	222,644
	7 mos.	269	7,841,943	350,920	8,962,866	1,078,883	958,086	209,375	2,515,214	296,799	5,053,829	56.4	3,909,037	3,515,069	1,477,593	835,159
New Jersey & New York	July	45	24,779	103,477	133,092	22,246	20,158	1,609	66,870	3,622	114,505	86.0	18,587	14,478	—19,390	—13,475
	7 mos.	45	186,991	672,562	902,276	114,452	160,246	12,184	482,625	25,418	794,900	88.1	107,376	78,602	—151,995	—166,627
N. Y., Susquehanna & Western	July	131	281,899	47,636	371,507	61,676	55,374	4,932	164,236	13,368	299,527	80.6	71,980	40,930	15,933	40,191
	7 mos.	131	2,326,360	301,222	2,898,021	371,725	372,593	36,668	1,314,540	85,010	2,180,378	75.2	717,643	499,730	324,320	166,825
Evansville, Indianapolis & Terre Haute	July	146	140,115	2,980	151,120	29,872	15,818	1,950	53,637	4,725	105,905	70.1	45,215	39,686	10,218	—16,130
	7 mos.	146	1,086,897	23,870	1,160,390	173,506	140,013	13,643	394,297	35,434	756,616	65.2	403,774	366,942	130,981	3,929

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Florida East Coast	July	857	$455,953	$151,324	$714,831	$126,958	$176,107	$24,318	$232,730	$47,544	$620,593	86.8	$94,238	—$52,714	—$102,500	—$200,307
	7 mos.	854	4,989,691	3,090,417	9,291,820	1,082,888	1,250,605	210,624	2,433,685	338,520	5,482,859	59.0	3,808,961	2,795,521	2,248,956	1,751,506
Fort Smith & Western	July	249	95,191	9,496	115,112	24,752	21,258	5,867	35,697	7,896	95,279	82.8	19,833	15,104	6,365	—8,787
	7 mos.	249	684,397	62,804	815,501	169,536	168,179	41,698	273,438	51,797	701,035	86.0	114,466	81,367	16,371	—49,193
Galveston Wharf	July	13	.....	.....	210,427	44,938	4,621	7,101	31,976	5,055	117,956	56.1	92,471	62,471	62,552	41,513
	7 mos.	13	.....	.....	1,206,480	300,329	36,390	32,376	223,163	44,268	754,627	62.5	451,853	319,853	319,817	310,243
Georgia R. R.	July	328	351,104	56,343	435,740	58,811	84,673	22,237	181,485	23,190	368,404	84.6	67,336	58,256	65,796	106,852
	7 mos.	328	2,459,477	374,620	3,067,062	353,917	588,372	158,283	1,284,088	167,477	2,550,869	83.2	516,193	439,376	516,842	474,186
Georgia & Florida	July	502	140,976	11,324	159,363	26,961	24,717	9,561	59,436	8,655	129,552	81.3	29,811	20,064	20,083	14,735
	7 mos.	461	812,176	69,616	950,647	186,973	154,671	69,716	402,019	60,038	864,717	91.0	85,930	17,907	42,885	93,563
Grand Trunk Western	July	345	1,678,198	229,289	2,011,435	354,935	396,329	46,487	640,108	63,606	1,508,473	75.0	502,962	407,883	248,847	270,809
	7 mos.	345	11,576,310	1,217,996	13,487,795	1,887,367	2,694,938	316,145	4,509,988	461,241	9,894,630	73.4	3,593,165	2,941,794	2,073,227	1,929,735
Atlantic & St. Lawrence	July	166	155,776	31,295	212,579	54,707	45,836	6,390	101,312	8,460	217,687	102.4	—5,108	—19,768	—68,156	—71,868
	7 mos.	166	1,016,081	180,129	1,344,501	390,001	308,009	42,829	695,709	60,153	1,507,587	112.1	—163,086	—271,749	—635,706	—746,489
Chic., Det. & Canada Gr. Tr. Jct.	July	59	247,398	875	292,693	20,734	14,165	4,586	94,756	3,410	137,635	47.0	155,058	143,826	113,598	155,919
	7 mos.	59	2,085,315	4,916	2,407,721	133,620	109,433	33,535	694,907	26,374	997,808	41.4	1,409,913	1,331,756	1,114,941	1,048,048
Detroit, Grand Haven & Mil.	July	192	724,651	28,496	804,869	99,184	60,697	14,073	276,648	17,508	464,348	57.7	340,521	325,546	214,631	224,393
	7 mos.	192	5,056,293	170,882	5,586,843	501,905	446,935	99,578	2,038,011	127,324	3,190,992	57.1	2,395,851	2,302,837	1,480,759	1,155,198
Great Northern	July	8,399	9,208,177	1,138,046	11,544,395	2,144,056	1,734,889	262,815	3,188,139	247,891	7,717,005	66.8	3,827,390	3,040,767	3,000,053	2,607,145
	7 mos.	8,402	53,254,048	6,371,838	67,729,953	11,538,933	11,719,340	1,911,701	21,356,297	1,594,366	48,814,173	72.1	18,915,780	13,882,209	13,693,437	10,049,366
Green Bay & Western	July	234	166,214	3,308	181,282	29,690	26,811	7,691	58,564	4,076	126,832	69.9	54,450	45,450	39,319	14,637
	7 mos.	234	1,062,345	36,190	1,138,342	182,075	168,462	46,307	451,758	22,666	870,245	76.4	268,097	210,049	169,296	163,934
Gulf & Ship Island	July	307	206,546	35,402	259,962	64,603	49,316	5,012	94,382	8,821	224,700	86.4	35,262	3,400	—12,708	—53,550
	7 mos.	307	1,465,201	254,834	1,891,571	405,273	362,204	35,648	729,419	56,388	1,612,513	85.2	279,058	56,225	—52,274	356
Gulf, Mobile & Northern	July	733	546,642	28,321	604,133	89,558	101,613	32,801	181,393	27,381	433,168	71.70	170,965	129,683	96,325	83,019
	7 mos.	733	3,849,058	177,999	4,255,187	642,629	682,974	228,403	1,284,852	201,679	3,042,997	71.51	1,212,190	920,796	689,872	595,218
Hocking Valley	July	348	1,651,774	54,084	1,966,409	222,905	329,454	17,304	486,027	44,766	1,098,703	55.9	867,706	742,965	660,030	547,375
	7 mos.	348	10,445,571	385,597	11,903,452	1,467,508	2,221,725	116.156	3,209,790	316,354	7,329,746	61.6	4,573,706	3,679,413	3,266,796	2,426,861
Illinois Central	July	5,025	9,598,029	1,590,089	12,022,251	1,795,367	3,193,280	270,068	4,110,519	355,561	9,808,418	81.6	2,213,833	1,387,723	1,463,653	1,639,269
	7 mos.	5,033	69,053,959	12,348,180	88,507,908	10,715,409	21,038,187	1,855,332	31,596,828	2,525,712	68,467,688	77.4	20,040,220	13,998,081	13,774,965	13,416,353
Yazoo & Mississippi Valley	July	1,705	1,686,689	266,727	2,075,499	429,144	438,433	43,450	827,248	65,692	1,812,060	87.3	263,439	89,894	22,665	12,941
	7 mos.	1,705	11,805,260	1,740,991	14,524,492	2,639,307	2,959,064	308,614	5,858,409	453,328	12,259,840	84.4	2,264,652	1,068,345	565,896	576,309
Illinois Central System	July	6,730	11,297,382	1,861,006	14,114,605	2,224,511	3,639,506	313,518	4,946,027	421,386	11,636,664	82.4	2,477,941	1,477,370	1,486,071	1,653,779
	7 mos.	6,739	80,948,696	14,113,906	103,146,621	13,354,716	24,040,451	2,163,946	37,516,801	2,980,064	80,833,316	78.4	22,313,305	15,068,447	14,342,882	13,958,554
Illinois Terminal	July	473	452,030	116,992	592,383	97,190	80,189	17,640	189,633	35,110	417,499	70.48	174,884	153,657	112,188	85,409
	7 mos.	473	3,088,861	919,916	4,185,716	529,745	614,669	137,214	1,397,166	265,240	2,938,406	70.20	1,247,310	1,098,348	819,519	548,956
Kansas City, Mexico & Orient	July	272	224,529	6,688	239,188	83,498	186,690	7,346	70,495	9,415	357,444	149.4	—118,256	—122,889	—103,898	36,984
	7 mos.	272	1,138,631	36,008	1,247,939	414,180	425,370	47,390	416,378	82,079	1,375,284	110.9	—127,345	—207,655	—43,496	238,553
Kansas City, Mex. & Or. of Tex.	July	465	309,771	10,823	333,040	131,957	35,430	8,296	93,469	9,594	278,746	83.7	54,294	47,941	—5,506	66,856
	7 mos.	465	1,972,948	82,747	2,174,937	628,161	327,881	54,281	590,255	59,410	1,647,394	75.7	527,543	530,200	226,689	208,468
Kansas City Southern	July	784	1,305,109	96,398	1,603,272	207,854	259,253	63,786	449,025	82,905	1,066,701	66.5	536,571	419,121	352,799	374,201
	7 mos.	784	8,900,782	595,490	10,707,582	1,320,145	1,775,587	438,235	3,207,698	597,940	7,345,698	68.6	3,361,884	2,538,347	2,114,779	1,951,767
Texarkana & Ft. Smith	July	81	255,123	7,546	286,332	5,670	30,548	8,436	58,859	15,376	118,627	41.4	167,705	150,736	113,458	73,098
	7 mos.	81	1,660,661	46,896	1,843,739	176,218	169,430	51,390	422,913	76,574	907,847	49.2	935,892	809,324	576,289	414,663
Kansas, Oklahoma & Gulf	July	326	310,536	2,562	331,162	32,985	30,746	15,580	64,529	9,951	151,728	45.8	179,434	159,418	138,659	47,180
	7 mos.	326	2,031,483	17,888	2,098,889	252,891	202,545	103,343	463,869	78,144	1,087,054	51.8	1,011,835	872,113	721,092	321,875
Lake Superior & Ishpeming	July	160	329,163	521	386,225	50,097	22,531	567	64,281	6,138	143,614	37.2	242,611	203,370	197,149	146,628
	7 mos.	160	1,506,165	8,407	1,738,828	250,805	188,875	3,634	374,759	55,189	873,156	50.2	865,672	688,441	657,999	212,130
Lake Terminal	July	13	.....	.....	140,864	11,495	14,521	.....	56,983	1,922	84,921	60.3	55,943	44,578	49,959	24,941
	7 mos.	13	.....	.....	684,426	85,517	106,660	.....	350,439	14,015	556,631	81.3	127,795	83,756	101,184	—11,456
Lehigh & Hudson River	July	96	207,643	1,472	237,589	24,880	35,914	2,704	74,602	9,173	147,273	62.0	90,316	73,109	52,732	16,640
	7 mos.	96	1,396,596	8,388	1,490,095	209,629	227,995	18,583	522,500	68,453	1,047,160	70.3	442,935	344,786	221,907	269,149
Lehigh & New England	July	216	302,152	1,070	311,869	48,131	82,561	5,753	132,028	16,373	283,999	91.1	27,870	23,456	16,529	105,287
	7 mos.	216	2,590,812	7,263	2,643,176	335,618	640,813	44,100	978,008	120,230	2,117,860	80.1	525,316	446,294	445,948	559,608
Lehigh Valley	July	1,361	4,544,661	595,521	5,640,032	593,262	1,287,829	153,315	2,268,225	147,825	4,482,987	79.5	1,157,045	865,157	760,785	780,104
	7 mos.	1,361	33,570,412	3,711,649	40,723,754	3,539,270	8,838,078	1,000,754	16,471,139	1,057,813	31,125,989	76.4	9,597,765	7,476,348	6,502,449	5,349,548
Louisiana & Arkansas	July	636	585,308	28,390	643,009	136,797	100,392	18,822	183,403	22,040	459,875	71.52	183,134	129,375	88,376	62,710
	7 mos.	636	4,039,660	141,774	4,362,111	775,625	646,022	167,313	1,322,020	164,534	3,068,350	70.34	1,293,761	937,883	640,390	439,320
Louisiana Ry. & Nav. Co. of Texas	July	206	79,053	2,827	85,377	24,270	12,570	1,581	32,053	3,400	73,874	86.5	11,503	7,522	—4,579	9,862
	7 mos.	206	527,889	17,161	577,760	167,655	97,836	18,979	260,919	38,146	583,535	101.0	—5,775	—56,551	—143,366	—143,722

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Louisville & Nashville	July	5,249	$9,035,007	$1,283,456	$10,953,509	$1,884,898	$2,634,963	$212,671	$3,752,391	$380,694	$8,902,155	81.3	$2,051,354	$1,358,191	$1,533,215	$1,467,961
	7 mos.	5,249	62,491,835	9,369,023	77,085,470	12,941,612	17,886,771	1,733,923	27,153,626	2,701,247	62,781,652	81.4	14,303,818	10,077,538	10,294,543	11,538,602
Maine Central	July	1,122	1,122,441	344,337	1,637,214	266,043	311,930	26,610	610,940	52,996	1,276,064	77.9	361,150	274,704	260,191	214,113
	7 mos.	1,122	8,080,592	1,809,588	11,470,473	1,636,693	2,370,974	133,326	4,209,213	361,679	8,721,183	76.0	2,749,290	2,153,880	1,939,355	1,526,141
Midland Valley	July	364	272,872	10,147	307,256	59,872	29,975	5,790	75,886	10,520	177,779	57.9	129,477	115,370	92,091	142,560
	7 mos.	364	1,824,246	82,024	1,983,844	355,277	206,439	44,134	517,765	82,866	1,192,164	60.1	791,680	682,714	533,055	533,970
Minneapolis & St. Louis	July	1,627	1,106,094	58,771	1,231,264	158,619	70,025	35,485	517,917	44,148	826,703	67.1	404,561	338,617	752,251	54,784
	7 mos.	1,627	6,936,619	495,867	8,035,653	1,144,834	1,308,226	251,406	3,708,667	331,035	6,742,384	83.9	1,293,269	852,167	970,428	—215,458
Minneapolis, St. Paul & S. S. Marie	July	4,380	3,559,817	547,058	4,764,922	694,518	895,845	90,670	1,433,542	126,425	3,288,147	69.0	1,476,775	1,222,211	1,068,839	635,018
	7 mos.	4,380	22,061,504	2,687,740	27,171,858	3,723,842	5,264,406	569,715	10,020,251	843,653	20,565,607	75.7	6,606,251	4,919,179	4,004,514	2,829,557
Duluth, South Shore & Atlantic	July	573	343,103	52,410	443,552	95,224	72,645	8,109	165,873	11,222	355,658	80.2	87,894	56,894	40,560	70,823
	7 mos.	573	2,334,522	364,214	2,935,507	509,201	489,140	53,457	1,239,873	78,453	2,383,869	81.2	551,638	330,636	211,549	132,557
Spokane International	July	165	85,210	9,012	108,950	20,096	8,377	3,803	31,046	7,246	71,397	65.5	37,553	32,116	27,252	25,185
	7 mos.	165	532,051	59,799	702,629	123,913	66,387	25,292	241,083	45,835	509,717	72.5	192,912	154,715	111,503	94,890
Mississippi Central	July	151	112,011	6,774	131,771	17,787	27,344	9,352	34,314	8,643	97,261	93.8	34,510	24,467	29,885	35,565
	7 mos.	159	843,624	43,283	929,216	128,435	174,656	66,396	248,572	57,773	675,646	72.7	253,570	186,390	196,219	201,150
Missouri & North Arkansas	July	364	137,373	10,262	157,135	33,706	20,606	9,934	53,671	8,863	126,659	80.6	30,476	27,883	16,343	—10,500
	7 mos.	364	913,935	70,561	1,052,174	248,904	164,287	67,225	409,534	61,071	951,385	90.4	100,789	81,395	—6,609	—47,642
Missouri-Illinois R. R.	July	202	191,826	1,495	199,976	23,554	30,841	3,719	49,457	5,834	113,299	56.7	86,677	75,149	50,392	50,558
	7 mos.	202	1,245,614	11,767	1,298,891	158,227	232,768	24,064	360,381	60,182	833,809	64.2	465,082	381,032	304,100	243,698
Missouri-Kansas-Texas Lines	July	3,188	4,121,082	515,222	5,001,015	808,403	781,754	131,721	1,389,389	175,275	3,297,382	65.9	1,703,633	1,385,557	1,158,516	1,148,240
	7 mos.	3,188	24,871,916	3,729,875	31,710,323	4,526,088	6,008,065	882,799	9,519,981	1,188,793	22,242,380	70.1	9,467,943	7,538,241	6,070,891	5,965,316
Missouri Pacific	July	7,461	10,014,550	1,135,784	13,363,428	2,503,238	1,808,714	341,229	3,849,991	404,753	8,958,294	67.0	4,405,134	3,727,971	3,154,864	1,761,659
	7 mos.	7,461	63,242,914	7,632,278	78,492,594	13,024,167	13,890,335	2,179,399	26,757,010	2,738,507	58,798,392	74.9	19,694,202	16,149,208	12,618,376	10,364,215
Gulf Coast Lines	July	1,026	880,467	124,667	1,155,395	199,255	215,995	49,873	277,619	62,129	790,707	68.44	364,688	308,367	279,059	204,385
	7 mos.	1,026	7,728,120	927,749	9,278,407	1,605,918	1,619,931	320,579	2,631,288	429,159	6,557,374	70.67	2,721,033	2,337,871	1,764,324	1,649,684
International-Great Northern	July	1,159	1,083,195	167,835	1,569,047	227,476	187,257	38,608	558,590	73,961	1,086,276	69.23	482,771	441,350	361,773	187,853
	7 mos.	1,159	8,199,539	1,211,329	10,578,464	1,707,753	1,690,733	266,418	4,252,360	496,831	8,386,648	79.28	2,191,816	1,895,835	1,152,464	921,959
San Antonio, Uvalde & Gulf	July	318	91,508	18,119	133,000	40,436	25,117	8,010	40,336	9,163	120,633	90.7	12,367	8,132	—18,500	18,640
	7 mos.	318	1,002,236	123,490	1,228,891	271,549	188,712	50,768	324,336	60,053	891,253	72.5	337,638	308,070	108,292	216,265
Texas & Pacific	July	2,015	3,357,271	448,940	4,387,684	631,226	688,830	100,663	1,209,109	130,290	2,768,412	63.1	1,619,272	1,431,431	1,196,757	872,743
	7 mos.	2,015	21,839,791	3,189,631	27,102,797	4,154,215	4,599,930	633,889	8,504,051	867,027	18,783,003	69.3	8,319,794	6,927,878	5,078,186	5,671,657
Mobile & Ohio	July	1,159	1,285,812	86,992	1,441,607	222,049	263,250	58,829	506,032	53,035	1,098,808	76.2	342,799	259,973	218,119	148,835
	7 mos.	1,159	8,884,823	581,489	10,122,286	1,530,680	1,889,389	400,771	3,628,258	348,014	7,781,233	76.9	2,341,053	1,743,913	1,393,919	1,138,766
Monongahela	July	171	592,924	9,221	607,164	80,000	75,000	911	145,735	11,048	311,275	51.3	295,889	269,351	165,618	161,512
	7 mos.	171	4,224,051	73,454	4,337,358	560,000	525,000	8,502	1,080,949	79,443	2,249,836	51.9	2,087,522	1,912,631	1,197,675	998,702
Monongahela Connecting	July	6	.....	.....	238,553	26,418	36,760	300	99,254	3,883	166,615	69.8	71,938	59,983	48,177	42,508
	7 mos.	6	.....	.....	1,567,053	170,799	241,815	2,100	662,810	27,457	1,104,981	70.5	462,072	380,970	334,322	215,124
Montour	July	56	228,520	.....	229,792	32,299	44,346	1,242	49,896	7,499	135,263	58.9	94,529	92,657	101,467	54,769
	7 mos.	56	1,314,475	2	1,319,419	174,820	342,943	9,508	301,463	50,993	875,216	66.3	444,203	432,588	508,113	365,488
Nashville, Chattanooga & St. Louis	July	1,222	1,576,792	249,405	1,976,405	246,092	391,397	69,717	662,806	78,555	1,455,269	73.6	521,136	426,050	441,408	465,587
	7 mos.	1,244	10,659,866	1,791,342	13,685,131	1,627,597	2,693,160	573,788	4,716,810	568,745	10,224,179	74.7	3,460,952	2,831,307	2,852,120	2,130,407
Nevada Northern	July	165	89,102	5,425	109,318	11,641	5,697	1,034	14,721	4,865	38,063	34.8	71,255	53,810	51,635	38,805
	7 mos.	165	691,623	45,255	829,764	85,706	47,252	6,940	122,095	35,616	298,923	36.0	530,841	423,365	409,143	212,154
Newburgh & South Shore	July	6	.....	.....	187,382	17,304	36,962	.....	71,550	6,125	131,941	70.4	55,441	37,826	39,503	29,031
	7 mos.	6	.....	.....	1,148,386	86,899	230,909	.....	471,054	43,568	832,430	72.5	315,956	202,821	238,865	210,102
New Orleans Great Northern	July	276	245,523	20,101	275,065	50,184	46,612	14,383	82,084	11,635	204,753	74.4	70,312	52,947	30,207	45,468
	7 mos.	276	1,678,022	116,248	1,864,925	312,443	285,866	94,312	550,749	81,685	1,324,915	71.0	540,010	416,398	244,049	284,930
New Orleans Terminal	July	20	1,625	.....	117,128	22,668	8,765	.....	55,244	2,098	88,775	75.8	28,353	17,346	11,518	6,350
	7 mos.	20	16,406	.....	1,125,210	123,015	64,840	530,038	418,282	12,004	618,141	54.9	507,069	434,107	352,875	227,858
New York Central	July	6,914	20,676,069	8,950,939	34,614,029	5,161,178	7,242,295	3,344,438	11,348,185	915,530	25,756,517	71.4	8,857,512	6,380,724	6,119,606	5,475,836
	7 mos.	6,914	140,591,930	56,081,657	228,353,649	29,458,192	50,931,037		78,935,013	6,405,785	172,702,057	75.6	55,651,592	39,060,236	37,367,094	34,021,150
Cincinnati Northern	July	244	304,521	3,231	316,584	35,097	61,157	6,149	101,157	11,337	214,897	67.9	101,687	76,410	71,488	34,881
	7 mos.	244	2,069,346	21,725	2,145,786	249,243	470,786	41,920	726,719	70,928	1,559,591	72.7	586,195	427,691	355,838	294,831
Cleve., Cinn., Chicago & St. Louis	July	2,397	5,838,637	1,147,830	7,676,289	958,370	1,664,143	170,565	2,683,610	243,067	5,793,976	75.5	1,882,313	1,429,280	1,305,287	868,808
	7 mos.	2,397	40,112,895	8,170,572	52,941,643	5,622,784	11,699,248	1,089,084	19,278,939	1,677,605	39,951,741	75.5	12,989,902	9,815,211	9,057,031	7,183,386
Indiana Harbor Belt	July	117	.....	.....	1,064,367	108,000	109,684	5,323	400,337	26,486	661,834	62.2	402,533	332,323	288,043	325,504
	7 mos.	119	.....	.....	7,393,388	756,000	784,909	35,666	2,950,959	194,110	4,810,010	65.1	2,583,378	2,124,855	1,819,420	1,668,874
Michigan Central	July	1,858	5,259,534	1,870,041	7,975,252	995,863	1,649,436	146,810	2,419,019	173,964	5,486,348	68.8	2,488,904	1,974,667	1,810,140	1,758,059
	7 mos.	1,858	39,466,156	11,541,839	56,814,181	5,684,646	11,953,310	946,789	17,757,821	1,205,406	38,294,696	67.4	18,519,485	14,599,455	13,464,866	12,635,305

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Pittsburgh & Lake Erie	July	231	$2,825,010	$197,046	$3,135,600	$368,296	$1,037,779	$28,961	$947,031	$77,232	$2,472,624	78.9	$662,976	$472,976	$813,172	$685,123
	7 mos.	231	17,869,647	1,300,984	20,024,272	2,287,366	7,069,686	201,492	6,403,588	552,037	16,583,271	82.8	3,441,001	2,210,738	4,640,414	4,035,014
New York, Chicago & St. Louis	July	1,690	4,392,426	217,605	4,915,411	634,688	990,412	145,415	1,560,159	152,421	3,461,499	70.4	1,453,912	1,201,095	915,328	541,345
	7 mos.	1,690	30,441,849	1,101,917	32,767,675	3,953,482	6,288,988	720,533	11,171,689	914,567	22,970,432	70.1	9,797,243	7,912,260	6,327,084	4,437,099
N. Y., New Haven & Hartford	July	2,132	6,665,637	4,037,920	11,886,038	1,801,223	1,969,216	127,807	3,562,194	326,699	7,957,201	66.9	3,928,837	3,287,397	2,777,171	2,278,186
	7 mos.	2,130	44,076,639	26,520,084	79,272,063	10,916,743	13,846,757	723,504	24,875,393	2,337,932	53,888,912	68.0	25,383,151	20,576,297	16,942,096	13,383,786
New York Connecting	July	20	194,424	.....	223,201	23,279	13,033	.....	38,390	1,287	75,989	34.0	147,212	111,212	85,412	60,155
	7 mos.	20	1,474,246	.....	1,697,775	322,811	60,516	.....	260,606	12,823	656,756	38.7	1,041,019	781,019	601,813	536,044
New York, Ontario & Western	July	568	671,021	509,353	1,379,953	204,203	220,724	20,103	493,749	33,137	972,488	70.5	407,465	362,226	293,854	264,623
	7 mos.	568	4,652,867	988,394	6,801,226	906,893	1,331,179	136,853	3,097,862	241,888	5,734,340	84.3	1,066,886	751,575	367,643	299,773
Norfolk & Western	July	2,240	9,281,538	434,081	10,035,751	1,158,823	1,681,076	117,648	2,142,758	245,915	5,349,627	53.3	4,686,124	3,835,582	4,109,542	2,879,885
	7 mos.	2,240	60,317,109	2,950,590	65,349,212	8,230,061	12,115,699	830,731	15,291,603	1,689,864	38,218,106	58.5	27,131,106	21,473,854	23,143,604	16,298,151
Norfolk Southern	July	931	518,506	46,476	657,430	94,862	90,043	26,980	253,374	28,797	493,805	75.1	163,625	111,705	104,225	91,950
	7 mos.	931	4,299,906	231,556	4,906,630	670,672	709,372	190,332	1,875,415	203,025	3,632,685	74.0	1,273,945	915,020	758,889	1,009,245
Northern Pacific	July	6,792	6,399,747	969,409	8,296,738	1,083,189	1,567,093	267,945	2,700,019	258,132	6,051,370	72.9	2,245,368	1,497,326	1,851,114	1,354,904
	7 mos.	6,792	41,661,496	5,849,012	52,962,691	8,192,291	10,842,482	1,697,923	18,571,163	1,834,721	41,901,604	79.1	11,061,087	6,308,804	9,048,192	8,989,033
Northwestern Pacific	July	477	350,948	201,077	613,599	102,236	84,872	7,419	236,135	14,573	445,219	72.6	168,380	131,797	125,625	176,608
	7 mos.	477	1,966,588	1,002,241	3,329,091	675,427	622,592	55,858	1,592,963	125,869	3,069,828	92.2	259,263	—6,996	—22,648	—66,937
Pennsylvania R. R.	July	10,501	43,900,607	10,719,670	60,662,253	8,221,116	10,710,111	903,499	19,595,642	1,518,275	41,596,440	68.6	19,065,813	15,410,848	13,858,510	9,716,097
	7 mos.	10,501	277,724,351	74,628,845	391,411,659	48,570,662	76,658,171	6,223,026	134,362,447	11,361,370	281,783,925	72.0	109,627,734	87,575,774	78,360,307	60,476,160
Long Island	July	404	886,884	3,153,563	4,250,440	420,573	440,576	22,303	1,336,933	69,074	2,290,236	53.9	1,960,204	1,483,499	1,329,088	1,129,029
	7 mos.	404	6,433,615	15,903,402	23,582,131	2,859,269	3,404,290	141,153	9,003,745	448,201	15,863,513	67.3	7,718,618	6,173,945	5,089,705	3,872,671
West Jersey & Seashore	July	370	408,769	719,744	1,182,648	125,578	121,690	7,674	413,692	19,671	691,468	58.5	491,180	258,908	229,206	142,228
	7 mos.	370	2,910,947	2,542,787	5,730,907	789,681	772,360	36,615	2,377,133	112,993	4,101,716	71.6	1,629,191	1,106,154	935,312	257,032
Peoria & Pekin Union	July	19	15,695	1,468	141,161	18,926	13,451	4,994	59,733	7,697	104,801	74.2	36,360	24,083	43,369	44,362
	7 mos.	19	133,269	10,749	1,026,710	121,866	93,012	38,663	442,514	60,382	756,437	73.7	270,273	159,169	278,647	401,452
Pere Marquette	July	2,241	3,871,879	337,753	4,533,148	567,214	802,158	72,155	1,376,386	112,827	2,914,290	64.3	1,618,858	1,360,559	1,184,437	889,715
	7 mos.	2,241	24,090,118	1,729,259	27,604,839	3,005,664	5,531,913	459,609	9,044,108	885,171	18,891,900	68.4	8,712,939	6,942,717	5,912,855	4,656,801
Pittsburgh & Shawmut	July	102	104,273	2,054	108,457	20,134	31,245	1,608	32,985	11,805	97,777	90.2	10,680	9,242	14,807	21,024
	7 mos.	102	899,056	24,565	937,927	140,601	232,881	11,816	274,441	59,342	719,081	76.7	218,846	209,344	229,867	338,901
Pittsburgh & West Virginia	July	92	371,668	4,012	406,144	36,552	85,322	18,136	70,715	24,936	245,632	60.5	160,512	119,856	202,529	185,868
	7 mos.	92	2,734,518	29,186	2,987,203	182,898	566,907	121,682	523,408	164,310	1,633,750	54.7	1,353,453	1,003,242	1,529,508	1,152,770
Pittsburgh, Shawmut & Northern	July	198	126,757	877	131,636	38,315	24,817	1,579	40,455	6,307	111,473	84.7	20,163	17,191	10,666	29,515
	7 mos.	198	997,692	9,238	1,037,540	210,946	198,515	11,558	326,792	44,449	792,260	76.3	245,280	224,332	171,065	183,608
Quincy, Omaha & Kansas City	July	249	48,221	7,774	63,482	28,542	10,816	986	24,552	2,917	67,363	106.1	—3,881	—8,738	—10,931	—102,297
	7 mos.	249	284,966	65,549	397,206	183,623	63,597	5,244	192,420	18,734	462,779	116.5	—65,573	—99,570	—115,977	—196,106
Reading	July	1,459	6,589,123	570,527	7,796,030	1,167,575	1,821,747	94,448	2,880,470	229,952	6,220,953	79.8	1,575,077	1,197,440	1,244,780	847,463
	7 mos.	1,460	47,281,374	4,137,947	55,608,361	8,197,667	12,853,113	642,732	20,748,784	1,567,568	44,215,753	79.5	11,392,608	8,942,182	9,019,542	8,033,147
Atlantic City	July	163	128,817	441,039	615,191	61,049	25,361	5,091	236,951	3,936	332,575	54.1	282,616	242,816	213,144	111,776
	7 mos.	163	853,357	1,114,368	2,125,796	424,336	166,740	31,762	1,250,183	34,907	1,908,856	89.9	216,940	—64,184	—215,700	—557,818
Richmond, Fredericksburg & Potomac	July	117	506,982	230,948	894,498	132,362	161,960	8,779	305,935	38,969	661,845	74.0	232,653	181,044	151,986	129,183
	7 mos.	117	3,960,470	2,319,843	7,558,049	988,310	1,186,747	66,665	2,431,782	256,605	5,089,292	67.3	2,468,757	2,032,035	1,623,449	1,180,328
Rutland	July	413	297,461	89,706	535,430	117,941	92,327	12,296	191,149	16,465	432,410	80.8	130,020	74,001	82,602	80,886
	7 mos.	413	2,051,119	574,417	3,538,927	640,616	712,309	76,258	1,375,827	118,031	2,935,737	83.0	603,190	418,650	476,554	553,772
St. Louis-San Francisco	July	5,304	5,979,076	895,182	7,403,083	1,123,150	1,464,020	132,961	2,287,140	226,991	5,132,433	69.33	2,270,650	1,792,758	1,821,742	1,651,978
	7 mos.	5,304	36,865,238	6,133,289	47,507,202	6,440,745	9,814,792	930,655	15,816,234	1,647,241	34,255,486	72.11	13,251,716	10,325,106	10,800,979	10,347,871
Ft. Worth & Rio Grande	July	233	77,075	6,800	96,691	32,340	18,073	4,034	44,069	6,076	103,883	107.4	—7,192	—11,495	—20,094	—40,126
	7 mos.	233	564,913	52,714	717,199	192,605	127,509	24,518	310,189	37,554	691,077	96.4	26,122	—4,428	—63,714	—105,570
St. Louis-San Francisco & Texas	July	154	153,504	11,170	175,839	32,297	26,748	5,064	54,185	7,161	125,245	71.2	50,594	47,939	18,717	—467
	7 mos.	154	954,096	78,671	1,089,919	191,541	180,562	37,959	397,223	53,468	859,491	78.9	230,428	209,186	14,728	—27,627
St. Louis Southwestern	July	939	1,388,259	62,276	1,516,954	177,007	216,278	70,793	384,113	65,187	924,748	61.0	592,206	530,357	363,434	324,571
	7 mos.	939	9,665,200	414,954	10,651,071	1,155,788	1,567,825	500,631	2,737,097	468,165	6,498,704	61.0	4,152,367	3,703,965	2,782,232	2,268,523
St. Louis Southwestern of Texas	July	807	540,732	36,549	638,703	236,320	133,609	33,705	286,130	35,699	733,770	114.9	—95,067	—122,586	—105,783	—115,504
	7 mos.	807	3,544,453	251,279	4,295,140	1,904,208	902,895	207,978	2,019,650	247,794	5,339,463	124.3	—1,044,323	—1,239,907	—1,069,287	—391,963
San Diego & Arizona	July	156	93,888	11,596	110,757	16,620	15,704	3,415	28,487	9,338	74,890	67.6	35,867	30,499	31,151	15,338
	7 mos.	156	677,554	131,521	834,021	134,008	116,018	29,016	207,329	57,876	554,077	66.4	279,944	239,227	239,498	164,053
Seaboard Air Line	July	4,490	3,288,652	393,042	4,206,122	493,405	802,894	188,198	1,527,009	177,417	3,196,949	76.0	1,009,173	723,054	775,766	619,522
	7 mos.	4,490	27,827,878	4,649,989	36,006,337	4,351,960	6,094,253	1,410,793	12,403,262	1,234,753	25,941,336	72.0	10,065,001	7,744,263	6,898,629	6,100,430
Southern Ry.	July	6,730	8,762,344	1,864,599	11,496,610	1,241,978	2,139,645	234,313	3,793,465	385,407	8,369,065	72.8	3,127,545	2,338,261	2,371,984	2,353,484
	7 mos.	6,730	62,274,950	12,849,112	83,382,070	12,661,842	15,009,422	1,721,897	27,385,733	2,630,016	59,907,174	71.8	2,347,896	17,951,129	17,287,599	15,451,940

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Alabama Great Southern	July	314	$620,479	$145,951	$825,262	$159,601	$172,984	$21,824	$234,384	$23,284	$619,066	75.0	$206,196	$135,802	$169,514	$124,751
	7 mos.	314	4,543,242	934,907	6,014,024	1,017,660	1,208,965	150,863	1,704,434	169,442	4,297,889	71.5	1,716,135	1,238,904	1,418,604	1,171,799
Cinn., New Orleans & Tex. Pacific	July	338	1,564,794	240,164	1,901,494	355,501	420,591	45,952	514,790	52,942	1,398,999	73.6	502,495	387,961	415,933	368,853
	7 mos.	338	10,651,635	1,822,087	13,447,317	3,390,919	2,903,382	309,190	3,662,313	375,071	10,726,738	79.8	2,720,579	2,099,268	1,923,779	2,660,419
Georgia Southern & Florida	July	397	247,012	61,961	330,894	65,735	83,501	1,601	122,443	2,468	279,147	84.4	51,747	28,532	51,920	—15,221
	7 mos.	397	1,638,759	704,609	2,652,677	526,082	577,172	31,388	965,471	38,690	2,183,011	82.3	469,666	305,450	321,614	50,901
New Orleans & Northeastern	July	204	350,627	65,685	446,402	66,481	85,651	11,006	125,690	15,505	308,455	69.1	137,947	91,467	55,202	48,030
	7 mos.	204	2,487,636	448,164	3,250,697	436,218	590,763	82,093	918,071	104,537	2,158,748	66.4	1,091,949	758,541	495,894	439,726
Northern Alabama	July	110	82,513	5,325	91,113	13,957	5,478	1,795	30,536	2,770	54,534	59.9	36,579	30,594	13,644	—8,433
	7 mos.	110	649,072	37,859	718,046	142,650	25,036	15,458	210,515	19,394	413,127	57.5	304,919	253,398	121,976	—8,307
Southern Pacific	July	8,870	14,917,620	3,637,683	20,401,927	2,366,149	2,852,301	447,285	6,189,305	666,580	12,946,485	63.5	7,455,442	5,810,148	5,247,621	4,179,928
	7 mos.	8,886	93,342,889	23,235,870	129,229,955	16,034,494	21 173,202	3,077,304	41,392,651	4,638,021	88,823,584	68.7	40,406,371	29,781,101	26,959,136	23,258,322
So. Pacific Steamship Lines	July	....	732,458	79,349	863,820	24,373	347,362	20,768	546,706	44,929	984,138	113.9	—120,318	—123,909	—120,440	56,802
	7 mos.	....	5,274,316	358,666	6,461,846	171,955	1,817,191	142,634	4,028,321	243,981	6,404,082	99.1	57,764	39,145	58,900	397,719
Texas & New Orleans	July	4,729	4,887,928	846,519	6,210,696	998,755	1,210,997	190,534	1,960,445	271,552	4,640,880	74.7	1,569,816	1,215,464	900,721	811,829
	7 mos.	4,729	32,868,271	6,124,657	42,447,942	6,632,547	8,684,649	1,252,583	13,951,821	1,837,276	32,437,532	76.4	10,010,410	7,616,828	5,527,763	3,179,416
Spokane, Portland & Seattle	July	554	620,230	123,633	816,979	127,237	104,005	14,875	239,183	22,870	517,129	63.3	299,850	213,291	194,547	210,724
	7 mos.	554	4,058,834	606,427	5,204,082	771,155	736,094	82,483	1,581,488	167,777	3,375,504	64.9	1,828,578	1,230,043	1,143,709	1,053,130
Tennessee Central	July	296	265.441	16,134	295,569	44,702	40,249	7,731	100,009	13,938	199,140	67.4	96,429	86,411	67,269	8,176
	7 mos.	296	1,643,452	114,356	1,880,476	353,820	297,296	60,873	674,007	91,647	1,468,948	78.1	411,528	365,339	242,885	187,167
Terminal R. R. Assn. of St. L.	July	55	.....	.....	1,091,077	154,801	78,483	2,754	442,160	24,815	707,138	64.8	383,939	279,321	366,712	277,892
	7 mos.	55	.....	.....	7,417,668	986,711	578,933	19,276	3,288,346	189,031	5,084,764	68.5	2,332,904	1,608,290	2,226,216	2,250,795
Texas Mexican	July	162	109,526	4,396	128,702	18,946	17,782	4,309	41,458	9,722	90,805	70.6	37,897	32,897	26,861	6,606
	7 mos.	162	711,203	21,523	823,846	134,226	130,424	29,001	303,844	56,192	649,734	78.9	174,112	138,841	85,391	121,966
Toledo, Peoria & Western	July	239	216,076	355	230,738	40,190	23,828	12,724	70,709	10,170	157,621	68.3	73,117	63,195	52,142	31,703
	7 mos.	239	1,265,170	4,886	1,317,863	149,355	161,381	81,415	447,473	62,505	902,129	68.5	415,734	361,348	291,256	119,371
Toledo Terminal	July	28	.....	.....	141,089	15,522	18,321	631	54,214	5,841	93,446	66.2	47,643	34,378	52,517	60,907
	7 mos.	28	.....	.....	948,604	72,902	123,083	4,084	391,183	39,407	628,252	66.2	320,352	208,870	370,642	374,906
Trinity & Brazos Valley	July	367	551,660	7,542	567,021	87,514	39,566	5,949	114,724	12,066	258,115	45.5	308,906	301,151	260,079	7,200
	7 mos.	367	1,408,360	41,649	1,503,288	359,023	243,654	38,817	558,149	82,707	1,273,944	84.7	229,344	174,721	—13,414	—138,022
Ulster & Delaware	July	128	35,698	74,356	151,772	17,401	15,357	1,711	61,304	4,033	99,806	65.8	51,966	42,566	36,500	47,995
	7 mos.	128	243,528	112,085	630,594	113,108	106,200	9,177	301,846	28,863	559,194	88.7	71,400	34,100	12,584	11,099
Union R. R. of Penna.	July	45	.....	.....	1,174,786	114,411	224,852	210	376,811	16,008	731,142	62.2	443,644	402,944	487,107	356,887
	7 mos.	45	.....	.....	6,384,731	652,282	1,265,069	1,259	2,502,372	101,257	4,521,064	70.8	1,863,667	1,674,140	2,150,810	1,549,728
Union Pacific	July	3,765	7,776,573	1,436,631	10,179,149	1,543,020	2,051,723	199,447	2,693,452	343,232	7,083,510	69.6	3,095,639	2,333,771	2,081,951	1,660,304
	7 mos.	3,765	49,283,967	8,682,108	63,852,852	8,142,008	13,764,144	1,362,349	17,764,044	2,385,244	44,742,914	70.1	19,109,938	13,977,766	12,922,155	11,589,143
Oregon Short Line	July	2,539	2,347,791	425,301	3,103,815	563,997	514,118	60,132	918,422	128,897	2,288,220	73.7	815,595	517,185	414,843	209,608
	7 mos.	2,539	16,984,123	2,311,604	20,999,159	3,713,682	3,271,112	402,829	6,130,805	926,865	14,917,926	71.0	6,081,233	4,067,388	3,581,313	2,573,645
Oregon-Wash. R. R. & Nav. Co.	July	2,365	2,050,202	293,639	2,608,514	447,296	410,247	83,455	881,579	131,290	1,979,136	75.9	629,378	428,102	279,257	21,438
	7 mos.	2,365	12,673,656	1,776,749	16,005,526	3,115,743	2,646,038	563,166	6,066,701	938,641	13,505,878	84.4	2,499,648	1,103,247	225,282	—292,195
Los Angeles & Salt Lake	July	1,208	1,631,325	503,029	2,375,356	360,237	479,768	80,713	698,924	88,733	1,807,336	76.1	568,020	411,276	278,074	262,709
	7 mos.	1,208	11,709,099	2,749,281	15,875,927	2,466,588	2,666,375	593,840	4,663,973	598,990	11,596,922	73.0	4,279,005	3,266,451	2,526,171	563,705
St. Joseph & Grand Island	July	258	293,814	9,970	328,163	71,573	66,199	3,921	100,597	15,595	257,885	78.6	70,278	52,272	29,691	22,272
	7 mos.	258	1,910,927	76,871	2,127,806	350,359	310,067	23,206	732,274	112,159	1,528,065	71.8	599,741	466,121	338,694	391,563
Utah	July	111	88,239	.....	88,425	16,213	31,800	381	22,515	5,013	75,922	85.9	12,503	7,549	6,503	—2,374
	7 mos.	111	1,105,064	.....	1,108,672	159,589	256,009	2,594	243,117	37,282	698,591	63.0	410.081	329,877	291,398	100,539
Virginian	July	545	1,527,289	32,868	1,653,923	178,291	295,498	13,888	322,973	33,602	842,294	50.9	811,629	641,628	726,473	521,547
	7 mos.	545	10,524,571	205,567	11,297,556	1,194,795	1,980,360	99,986	2,238,848	229,850	5,730,179	50.7	5,567,377	4,377,368	4,900,350	3,497,788
Wabash	July	2,523	5,580,296	625,726	7,025,554	1,268,649	1,202,454	191.000	2,323,492	254,231	5,264,951	74.9	1,760,603	1,436,234	1,152,755	706,787
	7 mos.	2,523	36,680,617	4,072,717	44,076,036	6,236,028	7,562,445	1,260,913	16,206.052	1,466,041	32,888,514	74.6	11,187,522	9,175,048	6,904,667	5,340,808
Ann Arbor	July	293	461,884	17,452	531,130	74,364	125,206	15,926	192,289	13,749	415,563	78.2	115,567	89,156	62,547	61,468
	7 mos.	293	3,380,685	112,163	3,648,894	390,442	746,280	102,064	1,381,490	84,913	2,682,922	73.5	965,972	775,050	582,524	460,796
Western Maryland	July	874	1,429,410	37,642	1,540,134	277,835	292,782	46,222	393,196	44,966	1,063,475	69.1	476,659	396,659	432,858	362,893
	7 mos.	874	9,968,383	188,065	10,560,346	1,740,834	2,097,374	302,679	2,875,357	299,273	7,335,371	69.5	3,224,975	2,664,975	2,932,237	2,737,553
Western Pacific	July	1,051	1,202,910	182,477	1,544,551	324,090	276,986	68,702	490,288	45,608	1,257,834	81.4	286,717	182,795	210,876	133,466
	7 mos.	1,051	7,871,477	828,382	9,375,145	1,913,244	1,895,215	492,959	3,383,202	330,615	8,155,818	87.0	1,219,327	504,972	902,754	99,084
Wheeling & Lake Erie	July	511	1,852,545	24,948	2,027,779	261,149	470,950	37,886	529,465	58,741	1,357,806	67.0	669,973	512,838	522,979	562,463
	7 mos.	511	11,939,174	152,667	12,888,869	1,486,731	3,005,320	263,207	3,542,356	342,612	8,641,657	67.1	4,247,212	3,239,542	3,143,181	2,520,685
Wichita Falls & Southern	July	168	96,247	1,501	103,290	20,468	10,975	2,705	29,326	3,712	67,166	65.03	36,124	30,649	24,003	33,848
	7 mos.	168	548,928	10,947	601,601	98,875	77,509	18,420	181,067	31,524	407,374	67.71	194,227	155,393	128,125	106,831

News of the Week

(*Continued from page 653*)

dow wiper for gas-electric and electric cars. Represented by C. A. Sprague.

Illinois Railway Equipment Company, Chicago.—Brake-hanger suspension, pipe clamps, retainer-valve anchor, draft-gear carrier and positive brake-pin locks. Represented by B. S. Rockwell.

The Joyce-Cridland Company, Dayton, Ohio.—Jacks and air-jack hoists. Represented by Harry Brock, Huston Brown and C. L. Brunnell.

W. M. Lalor Company, Chicago.—Commutator-dresser products, leather, fire extinguishers and leather cloth. Represented by W. M. Lalor and Fred I. Tourtelot.

Charles R. Long, Jr., Company, Inc., Louisville, Ky.—Paints, varnishes and lacquers. Represented by M. H. Oakes, J. S. Lemley and J. C. Weedon.

The Macleod Company, Cincinnati, Ohio.—Oil-burning rivet forges, portable oil burners, sand-blast machine, paint sprayer. Represented by James Shields.

MacRae's Blue Book Company, Chicago.—Reference book. Represented by T. H. MacRae, D. Ilette, C. Hill, L. Simonson and R. H. Morrison.

Midgley & Borrowdale, Chicago, representing Massachusetts Mohair Plush Co., Boston, Mass.—Plush; Cleveland Tanning Co., Cleveland, Ohio—Leather; Textile Leather Corp., Newark, N. J.—Imitation leather; Henry Geissel Company, Chicago—Drinking coolers; and Protech Manufacturing Company, Chicago, Weather-seal windows. Represented by J. M. Borrowdale, S. W. Midgley, R. W. Preikschat, A. W. Barth and D. H. Harnley.

W. H. Miner, Inc., Chicago.—Models of draft gears, bolster center locking pin, full size safety hand brake and full size friction draft gear. Represented by B. S. Johnson, R. H. Miner, Henry Miner, Roy Weber, C. A. Berger, A. B. Withall, Karl Woessner and A. G. Peterson.

Murphy Varnish Company, Newark, N. J.—Lacquer, varnish, enamel and natural wood panels; these shown in steps down from primer coats to the finishing coats, such as used on passenger and locomotive equipment of the present day. Exterior and interior finishes. Represented by C. M. Baker, W. D. Horton and J. C. Dannaher.

National Carbide Sales Corporation, New York.—Lanterns for car inspection, motor cars and signal men; portable lights and for wreckers and repair jobs on tracks and bridges. Represented by R. C. Holcomb and D. Anglada.

National Lead Company, New York.—Red lead paste and liquid, white lead paste, fluting oil and linseed oil, boiled and raw. Represented by A. H. Sabin and F. E. Dodge.

National Malleable & Steel Castings Company, Cleveland, Ohio.—Draft gears, couplers, journal boxes and parts, flangeless body center plates and coupler yokes. Represented by F. E. Moffett and J. F. Hutson.

Oxweld Railroad Service Company, Chicago.—Oxy-acetylene equipment, railroad lamps and carbide light reflectors. Represented by G. M. Crownover, M. A. Denton, O. F. Ladtkow, A. N. Lucas, J. J. Saeleus and E. L. Williams.

Pittsburgh Plate Glass Company, Milwaukee, Wis.—Paint and varnish. Represented by L. F. Theurer and W. T. Carey.

Railway Car & Equipment Corporation, East Chicago, Ind.—Literature. Represented by Frank Parker and J. P. McNally.

Spring Packing Corporation, Chicago.—Spring journal-box packing and oil and waste renovating plants. Represented by J. S. Hearons and W. M. Gibbs.

Standard Auto-Tite Joints Company, Pittsburgh, Pa.—Flexible ball joints; steam, air and water connections; metallic steam-heat connection for passenger coaches and metallic connections for locomotive and tender. Represented by A. M. Frauenheim, E. H. Mattingley and H. W. Barhyte.

Standard Coupler Company, Chicago.—No exhibit. Represented by J. N. Welles.

The Symington Company and the Gould Coupler Company, Chicago.—Double-truss truck side frame, swivel-butt coupler, journal boxes and lids. Represented by A. G. Brandenburg and C. R. Naylor.

Union Asbestos & Rubber Company, Chicago.—Asbestos materials. Represented by J. H. Kuhns and O. J. Rudolph.

Union Draft Gear Company, Chicago.—Cardwell friction draft gear. Represented by J. E. Tarelton, J. A. King, C. J. Gorman, R. W. Schultz and O. C. Heckart.

Universal Draft Gear Attachment Company, Chicago.—Passenger and freight-car hand brakes and brake slack adjusters. Represented by H. I. Wrigley, C. C. Kinsman and L. A. Johnson.

Vanadium Corporation of America, Chicago.—No exhibit. Represented by C. B. Woodworth.

Vapor Car Heating Company, Inc., Chicago.—Vapor system, thermostatic control, improved metallic conduits, end train-line valves, steam hose couplers (improved types), coach-yard conduits and fin-type radiation. Represented by N. F. Burns, E. E. Smith, E. C. Post, P. B. Parks and J. H. Gillick.

Waugh Equipment Company, New York City.—Draft gears. Represented by R. C. Munro.

Western Wheeled Scraper Company, Aurora, Ill.—Air dump cars. Represented by Jess Mossgrove and Jay Huber.

Westinghouse Air Brake Company, Wilmerding, Pa.—Variable reservoir release valve, brake cylinder protectors, conductor's caboose valves, pneumophonic horns, electrically welded reservoirs, packing cups and gaskets, super governor, single cast piston packing rings for compressors, feed valve, universal valve equalizing-cylinder cap with strainer. Represented by L. M. Carlton, P. E. Yancy, J. R. Holtom, P. H. Donovan and G. C. Farmer.

Whiting Corporation, Harvey, Ill.—Stoker, portable car hoist and passenger-car washer. Represented by J. Lindsay, H. K. Christie and F. P. Walsh.

The Wine Railway Appliance Company, Toledo, Ohio.—Door locks, cast-steel hopper frames, all-steel ladders, side bearings, drop end-door locks and box-car ventilators. Represented by C. J. Holland and E. H. Fisher.

Edwin S. Woods & Company, Chicago.—Anti-friction side bearings. Represented by G. S. Crawford.

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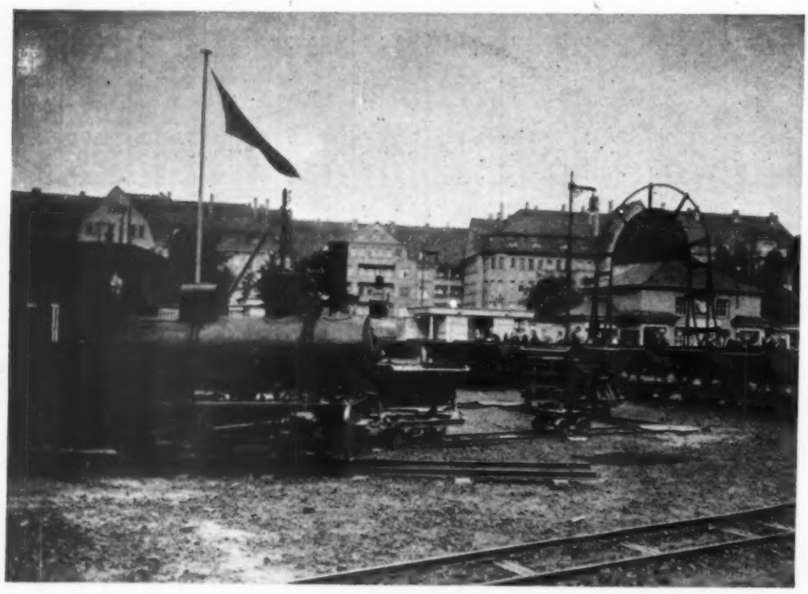

A Section of the General Railway Exhibit at the Leipzig, Germany, Trade Fair

Traffic

The Boston & Maine announces that with a view to making Columbus Day a "visiting day" in New England, round trip tickets will be sold throughout the system for October 11, 12 and 13, at a single fare, plus one dollar.

The Canadian National announces that its colonization department now invites not only immigrants from Europe but all citizens of Canada, in its efforts to colonize western Canadian farm lands. Within the past three years, nearly 2,000,000 acres of new land along the western lines of the Canadian National have been settled through the agency of this railway bureau.

A hearing on the application of Kentucky coal operators for reduced rates on coal moving into the Chicago market was held before representatives of the Interstate Commerce Commission at Louisville, Ky. on September 6 and 7. The complainants submitted testimony to show that unemployment among miners exists because of the freight rate advantage which Illinois and Indiana mines enjoy over Kentucky operators.

The Boston & Maine announces that its passenger trains during the past summer have come within two per cent of a perfect on-time performance, the best record which has ever been made, and this notwithstanding the fact that the principal summer trains are scheduled 55 minutes faster than four years ago, and in spite of delays due to much construction work now going on in connection with the improvement of bridges and roadbed.

Interstate Commerce Commission, on September 5, issued special permission to certain Southwestern and Mississippi valley railroads to file, on one day's notice, tariffs reducing rates on grain and grain products for export from Kansas City to Louisiana and Texas gulf ports from 30½ to 23½ cents to meet reduction made effective August 15 by the Kansas City Southern. Applications for special permission for reductions from other market points were denied.

The Merchants' Association of New York, continuing its argument before the Interstate Commerce Commission protesting against rates for transportation of merchandise by express, has filed with the commission a further criticism of the way in which the express carriers calculate rates, taking as typical examples the rates from 21 cities which have been studied. The protest declares that in 17 per cent of the sub-block rates from these cities, excessive and illegal rates have been found. The express officers are accused of using a mileage basis when that will work in their favor and the sub-block basis when mileage rates will be less favorable to the carrier. It is declared that the formula prescribed

by the commission is a dead letter, so far as the present rates structure is concerned.

The Southern Pacific has established automobile baggage car service between Wells, Nev. and Ogden, Utah, thereby enabling motorists to eliminate the 234-mile drive around Salt Lake. Automobiles are carried as baggage and without delay to autoists who apply for the service one hour prior to train departure time. Automobile baggage service is given daily out of Ogden at 7:05 a. m. on train No. 21, arriving in Wells at 12:33 p. m. Eastbound, autos are carried from Wells at 8:52 p. m. on train No. 10, arriving in Ogden at 3 a. m. Train No. 10 does not carry an Ogden Pullman but motorists may obtain sleeping car accommodations on the Gold Coast, leaving Wells daily at 4:18 p. m.

N. Y. Traffic Club Outing

The Traffic Club of New York will hold its September golf outing at the Echo Lake Country Club, Westfield, N. J., on September 17. Following are the events:

FOR MEMBERS ONLY
MORNING
Class A
Handicap Scratch to 22
18 Holes Medal Play
Prize for first low net Prize for second low net
Class B
Handicap 23 to 30 (inclusive)
18 Holes Medal Play
Prize for first low net Prize for second low net
AFTERNOON
Class A and Class B
Prize for first low net Prize for second low net
18 Holes Medal Play
For Members and Guests
(Morning and Afternoon)
Blind Bogey 18 Holes—Prize

The Ram Special

The Baltimore & Ohio, in cooperation with Ohio State University and other Ohio organizations, plans to educate the farmers of that state in the art and science of sheep raising, by running a lecture and exhibition train over its lines for six days beginning September 16. Stops will be made at eleven towns, viz: Mount Vernon, Toboso, Freeport, Flushing, Bolmont, Quaker City, Zanesville, Malta, Waterford, Marietta and Athens. The train will carry six carloads of pure bred guaranteed rams to be sold at cost to farmers. A number of sheep growers have already placed advance orders with the county agricultural agents. O. K. Quivey, general agricultural agent of the road, says that there will be on exhibition experimental sheep, from the Carpenter Test Farm, showing the effects of different systems of management over a five year period.

Traffic Clubs' Convention at St. Louis

The program of the semi-annual meeting of the Associated Traffic Clubs of America, which will be held at St. Louis, Mo. on October 15 and 16 will include addresses by William H. Williams, chairman of the board of the Wabash and the Missouri Pacific, Samuel O. Dunn, editor of the *Railway Age*, R. H. Aishton, president of the American Railway Association, C. S. Jones, president of the Curtiss Flying Corporation, and George Hannauer, president of the Boston & Maine. The following subjects will be discussed at the meeting: Railroad Consolidation—its present status and various policies involved; motor transportation—the economies of this form of transportation, competition and co-ordination with other agencies; inland waterways—existing and proposed projects and economies; commercial aviation—its cost compared with other agencies and coordination.

Pennroad Forwarding Subsidiary Plans Expansion

The National Freight Company, Pennroad Corporation subsidiary, recently formed to do a general freight forwarding business in conjunction with the Pennsylvania and other railroads has acquired control of G. W. Sheldon & Company, of New York and Chicago, one of the oldest domestic and foreign freight forwarding concerns in the country.

The acquisition of the G. W. Sheldon Company gives the National Freight Company representation throughout Europe as well as in Canada and the United States. The domestic forwarding business of the Sheldon Company also has been absorbed by the National and will be operated as part of its activities. The organization and personnel of the Sheldon Company will be continued as at present, together with its two offices, 115 Broad street, New York and 220 South State street, Chicago.

The National Freight Company, the announcement further states, expects in the near future to take over several additional freight forwarding firms. Their facilities, together with plants which the company itself is establishing in every city of importance in the United States, are expected to place the new organization in a leading position in the domestic and foreign freight forwarding field.

Foreign Railways

Train Tablets in New Zealand

On the New Zealand Government Railways, where the train tablet of Tyer & Company has been in use for single track blocking for 24 years or longer, there are now 364 stations equipped with a tablet exchanger designed by H. J. Wynne, signal engineer of the Government lines, and all of the road locomotives are fitted with exchanging apparatus, obviating all necessity of passing tablets on to moving trains by hand or hoop. With the present business of the New Zealand lines, about 5000 exchanges are made every day, and failures are practically nil. Express trains exchange the tablets at a speed of 40 miles an hour. The roadside apparatus requires but little attention, and the adjustment of the apparatus on the locomotive, at the regular periodical tests, is a simple matter.

British Railway Accidents, 1928

The report of the Ministry of Transport on railway accidents in Great Britain for the year 1928, which has been submitted by Lieutenant Colonel A. H. L. Mount, chief inspecting officer, shows the number of passengers killed in train accidents in the year to have been four times the average of the preceding eight years, and the number of employees twice the eight-year average. The principal totals of the tables are:

In train accidents, 48 passengers, 15 employees and nine other persons killed, and 716 passengers, 108 employees and 71 other persons injured, as compared with 27 passengers, two employees and seven other persons killed and 518 passengers, 117 employees and 38 other persons injured in 1927. Train service accidents and non-train accidents bring the totals, all classes, up (for 1928) to 460 killed and 24,324 injured, as compared with 435 killed and 25,403 injured in 1927. Of the 48 passenger fatalities in train accidents in 1928, it is noted that 41 were due to two train accidents, those at Darlington and Charfield.

Colonel Mount discusses briefly the subject of automatic train control but offers little comment, expecting that shortly the Ministry will issue the report of the special committee which has been appointed to reinvestigate that subject.

Train Runs 775 Miles Without a Stop

The Buenos Ayres Great Southern, according to a letter from the genera. manager, published in the Railway Gazette (London), made an experimental run, last July, with a Diesel-electric locomotive on which the trip from Buenos Ayres to Cipolletti, in the Rio Negro section, a distance of 775 miles in 20 hours, 37 minutes, was made without a stop. This locomotive is powered with a Beardmore 8-cylinder, 4-stroke Diesel engine, with a normal brake horse-power of 375 at 700 r. p. m. The engine is direct-coupled to a Metropolitan-Vickers compound-wound, direct-current generator, rated at 300 kw. 750 volts. The train, consisting of a locomotive weighing 62 tons and two passenger cars weighing about 94 tons, left Buenos Ayres at 11:08 p. m. on July 6, and completed its journey at 7:45 p. m. on July 7. The average speed was 37½ miles an hour and for long distances the rate was maintained at 47 miles an hour, which is the maximum speed allowed for this locomotive.

The Railway Gazette prints a tape record of the run, made on a Teloc speed recorder. The amount of oil consumed was 2,174 lb. The weather during the trip was cold, the temperature going below the freezing point during the night.

The track of the Buenos Ayres Great Southern is of 5-ft. 6-in. gage.

Equipment and Supplies

Locomotives

THE CHILE EXPLORATION COMPANY, a subsidiary of the Anaconda Copper Company, has ordered from Westinghouse Electric & Manufacturing Company three 76-ton electric locomotives for use in the Andes nitrate mines of South America.

Freight Cars

THE DUPONT COMPANY is inquiring for 45 alcohol cars.

THE NORFOLK & WESTERN is inquiring for 2000 all-steel hopper coal cars of 57½ tons' capacity.

L. G. EVERIST has ordered one 20-yd. lift-door air dump car from the Koppel Industrial Car & Equipment Company.

H. W. KAYLOR has ordered four 20-yd. drop-door air dump cars from the Koppel Industrial Car & Equipment Company.

THE SOUTH AFRICAN RAILWAYS, Johannesburg, South Africa, are inquiring for 150 freight cars of 50-tons capacity.

THE WAGNER QUARRIES COMPANY has placed an order for two 20-yd. drop-door air dump cars with the Koppel Industrial Car & Equipment Company.

A. GUTHRIE & COMPANY has ordered from the Koppel Industrial Car & Equipment Company ten 20-yd. lift-door air dump cars.

THE YOUNGSTOWN SHEET & TUBE COMPANY has ordered four 30-yd. air dump cars from the Koppel Industrial Car & Equipment Company.

WINSTON BROTHERS COMPANY, Minneapolis, Minn., has ordered 150 drop door, air dump cars of 30-yd. capacity from the Western Wheeled Scraper Company.

THE NEW YORK, NEW HAVEN & HARTFORD has revised its inquiry for 75 coke car bodies of 40 tons' capacity, (reported in the *Railway Age* of July 20) and is now looking for 75 complete 40-ton coke cars.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC has ordered 500 mill type gondola cars of 70 tons' capacity from the Pressed Steel Car Company and 500 from the Bettendorf Company. Inquiry for this equipment was reported in the *Railway Age* of August 10.

Passenger Cars

THE READING is inquiring for two 54-ft. passenger trailer cars.

THE PENNSYLVANIA is inquiring for five 73-ft. passenger, smoking and baggage gas-electric rail motor car bodies.

THE CANADIAN NATIONAL has ordered one combination passenger and baggage gasoline rail motor car from the J. G. Brill Company. This is in addition to the order reported in the *Railway Age* of August 24.

Iron and Steel

THE CHESAPEAKE & OHIO is inquiring for 55,000 tons of rail and 1,500,000 tie plates.

THE GREAT NORTHERN has ordered 180 tons of structural steel for a boiler house at Hillyard, Wash., from the Hofius Steel and Equipment Company.

THE MICHIGAN CENTRAL has ordered 800 tons of structural steel for grade separation work at Detroit, Mich., from the McClintic-Marshall Company.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 450 tons of structural steel for a viaduct at Kansas City, Mo., from the Kansas City Structural Steel Company.

Machinery and Tools

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for a 5-ft. radial drill.

THE UNION PACIFIC has ordered from Manning, Maxwell & Moore, Inc., five locomotive pit drop tables.

THE SOUTHERN PACIFIC has ordered from Manning, Maxwell & Moore, Inc., three Bridgeport Safety Emery Wheel Company's No. 7-A.C. motor driven floor grinders.

Signaling

American Signals for Russia

The Union Switch & Signal Company has received an order for the material needed for extensive signaling on the Moscow, White Russia & Baltic Railroad, in Russia. Color-light signals to the number of 103 are ordered for automatic block signaling on the line between Volokolamsk and Pakrovskoe, 71 miles. An electric interlocking with a 15-lever machine, Model 14, is to be installed at Pavshino. This interlocking will call for 10 searchlight signals.

A low-voltage interlocking is to be installed at Kholshcheviki; eight color-light signals and four low-voltage switch layouts; a machine of six levers.

Dispatcher control is to be provided at Opalikha and at Tushino. The order also includes material for revising interlocking now in service at certain stations on the line, to include electric operating levers, electric route-locking and new color-light signals.

Supply Trade

J. B. Holston has been appointed branch manager of the St. Louis sales office of the **Wagner Electric Corporation,** with headquarters at St. Louis, Mo.

H. O. K. Meister has been appointed assistant general manager of the **Hyatt Roller Bearing Company,** Newark, N. J.

The Chain Belt Company, Milwaukee, Wis., has moved its Houston office to 1310 Second National Bank Building.

R. F. Hoffmark, general superintendent of **A. Guthrie & Co., Inc.,** has been promoted to vice-president.

Eccles & Davies Machinery Company, Inc., of Los Angeles, Cal., have been appointed West Coast representatives of the **Hyatt Roller Bearing Company.**

C. E. Klumb has been appointed sales manager of the **J. J. Newman Lumber Company** and the **Homochitt Lumber Company,** with headquarters at Brookhaven, Miss.

The Scully Iron and Steel Company, Chicago, has awarded a contract to M. Boyle and Company for the construction of a one-story warehouse in that city.

George J. Diver has been appointed general manager of sales in charge of the frog and switch division of the **Morrison Railway Supply Corporation,** with headquarters at Chicago.

Walter C. Fish, retired general manager of the Lynn works of the **General Electric Company,** died at his home in Boston, Mass., on September 8. He had retired from the service of the company more than three years ago on account of ill health.

F. B. Caldwell, vice-president of the Chicago plant of the **Link-Belt Company** has resigned on account of ill health. **W. C. Carter,** vice-president in general charge of production at all the company's plants, will assume the duties of vice-president and general manager of the Chicago plant. **E. J. Burnell,** manager of the Pittsburgh office, has been appointed sales manager of the Western division, with headquarters at the Chicago plant, and **Nels Davis** will succeed Mr. Burnell as manager of the Pittsburgh office.

Obituary

Thomas F. Carey, president of the **Thomas F. Carey Company,** died on September 4, at his home in Brooklyn, N. Y.

John D. Hurley, president of the **Independent Pneumatic Tool Company** who died suddenly on August 15, was born at Simsbury, Conn. After receiving his education at Galesburg, Ill., he entered railway service with the Chicago, Burlington & Quincy. Later he was in the employ of the Louisville & Nashville at Louisville, Ky., and after this he took an active part in the building of railroads in Mexico. In 1898, he, with his brother Edward N. Hurley, Sr.,

John D. Hurley

organized the Standard Pneumatic Tool Company which was one of the first concerns to introduce air tools in railroad shops and other industries. On March 1, 1902, this company was absorbed by the Schwab interests and Mr. Hurley became identified with the Rand Drill Company of New York. In 1905 Mr. Hurley returned to Chicago and organized the Independent Pneumatic Tool Company.

* * *

Construction

ATCHISON, TOPEKA & SANTA FE.—Plans are being completed for the construction of a reinforced concrete viaduct to carry Wilson avenue over the tracks of this company at Ottawa, Kan. The cost of the structure will be borne by the railroad and Franklin county.

BALTIMORE & OHIO.—A contract has been given to the Vang Construction Company, Cumberland, Md., for the construction of an extension to a concrete arch at Snowden, Pa., to cost approximately $40,000.

CHICAGO & NORTH WESTERN.—A contract has been awarded to the Ogle Construction Company, Chicago, for the construction of one four-track and one three-track electrically-operated ash handling plant at Proviso, Ill., and one two-track ash handling plant at Adams, Wis.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—A contract for the construction of a 500-ton electrically-operated reinforced concrete coaling station at Altamont, Ind., has been let to the Ogle Construction Company, Chicago.

COLORADO & SOUTHERN.—A contract for the construction of a reinforced concrete gravity sand plant at Denver, Colo., has been let to the Roberts and Schaefer Company, Chicago.

ERIE.—A contract has been awarded to the Roberts and Schaefer Company, Chicago, for the construction of a 500-ton capacity sand drying and storage plant, an electric direct engine coaler and a cinder plant at Dunmore, Pa.

GRAND TRUNK WESTERN.—A contract has been let to the Ogle Construction Company, Chicago, for the construction of a 300-ton electrically-operated reinforced concrete coaling station and sand handling plant at Pontiac, Mich.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—A contract has been let to the Southern Ferro Concrete Company, Atlanta, Ga., for the construction of a passenger station at Atlanta at a cost of $225,000. This contract covers erection of the building only. Other work in connection with this project, including the construction of platforms, sheds and tracks, will be undertaken by company forces at a cost of $350,000.

NEW YORK CENTRAL.—This company has awarded to P. T. Cox Contracting Company Inc., New York, a contract for the installation of duct lines and splicing chambers at Spuyten Duyvil.

NEW YORK CENTRAL.—A contract for the installation of a direct steaming system to serve a portion of the new engine-house at Harmon, N. Y., has been awarded to the Railway Engineering Equipment Company, Chicago.

NEW YORK CENTRAL.—Two additional contracts for special work on the combined garage, service station, and boiler house which is now being built by this company on West End avenue, New York City, have been awarded. The elevator equipment will be furnished by the Otis Elevator Company, New York, and the sprinkler system is to be installed by Wells & Newton Company, Inc., New York.

NEW YORK, NEW HAVEN & HARTFORD.—A contract has been awarded to C. W. Blakeslee & Sons, Inc., of New Haven, Conn., for the realignment of this company's main line tracks in the vicinity of Sachem's Head Station, near Guilford, Conn. The work, which has been undertaken to reduce curvature, will cost about $160,000.

NEW YORK, NEW HAVEN & HARTFORD.—Contracts for an extension of the present boiler house at this company's Fargo Street Fruit Terminal, South Boston, Mass., have been awarded as follows: To Tredennick-Billings Company, Boston, for the construction of the building; to Lumsden & Van Stone Company for piping, distribution lines, etc.; and to Oscar F. Carlson, of Springfield, Mass., for the boiler setting work. The total cost of the new structure, which will accommodate three additional boilers, will be about $50,000.

NORTHERN PACIFIC.—This company plans, contingent upon the granting of approval by the Interstate Commerce Commission, the construction of 87 miles of branch line from Brockway, Mont., westerly to Jordan, about 60 miles, and southwesterly from Jordan to Edwards, about 27 miles.

PENNSYLVANIA.—A contract for the construction of a single-track ash handling plant and a single-track automatic direct coaler at Lock Haven, Pa., has been awarded to the Ogle Construction Company, Chicago.

PENNSYLVANIA.—A contract has been given to the Arundel Corporation of Baltimore for the construction of an undergrade bridge, costing about $48,000, at Kenwood ave., Baltimore.

PENNSYLVANIA.—A contract for the reconstruction of a bridge on the Richmond branch, over Madison road, Madisonville, Ohio, has been let to the Mellon Construction Company of Chicago. The cost is about $35,000.

PENNSYLVANIA.—In connection with its South Philadelphia track elevation project, this company has awarded a $40,000 contract to James McGraw Company of Philadelphia, for track work on Twenty-Fifth street, between Passyunk and Delaware avenues, and in adjacent yards.

TEXAS & NEW ORLEANS.—This company and Morgan's Louisiana & Texas Railroad & Steamship Company have applied to the Interstate Commerce Commission for authority to extend their operations in Terrebonne Parish, La., by the construction of 7.3 miles of new line with the necessary connections to industries, from the present terminus of the M. L. & T. line to the margin of Bayou Grand Caillu.

Financial

BALTIMORE & OHIO.—*Bonds.*—The Interstate Commerce Commission has authorized the Baltimore & Ohio Southwestern to extend from July 1, 1925, to July 1, 1950, the maturity of $45,000,000 of its first mortgage gold bonds and to pay 5 per cent interest instead of 3½ per cent, which rate the bonds formerly bore. The bonds are owned by the Baltimore & Ohio and are pledged with the trustees of that company's Southwestern division first mortgage.

BOISE & WESTERN.—*Operation*—The Interstate Commerce Commission has authorized this company to operate a railroad from Boise, Idaho, to Star, 16 miles, and from Boise to Onweiler Junction, 9 miles.

CANTON.—*Stock Acquired by Pennroad Corporation.*—This company, which owns the stock of the Canton Railroad, and other terminal property near Baltimore, Md., has filed with the Interstate Commerce Commission a statement saying that it is informed that the great majority of its stock has been purchased by and is now in the name of the Pennroad Corporation. This was in reply to a petition of the Western Maryland asking the commission to re-open for further evidence a case involving divisions of the Canton Railroad and stating that it understood that control of the company had been acquired by the Pennsylvania Railroad. The Pennsylvania filed an answer stating that it had not acquired such stock directly or indirectly.

CENTRAL VERMONT, INC.—*Reorganization Plan.*—This company and the Canadian National have filed with the Interstate Commerce Commission an application for approval of the reorganization plan by which the new company asks authority to acquire and operate the property of the Central Vermont, which has been in receivership since 1927 and which was sold at foreclosure on July 29 for $22,000,000, the purchasers also assuming liability for $5,000,000 of receiver's certificates. It is proposed to issue $10,000,000 of common stock, $5,000,000 of debentures, and $12,000,000 of first and general mortgage bonds, all of which are to be delivered to the Canadian National in reimbursement of its expenditures in connection with the reorganization and its assumption of liabilities under an agreement with the purchasers at the foreclosure sale.

CHICAGO & NORTH WESTERN.—*Capitalization.*—The directors of this company have authorized an increase in capital stock from $200,000,000 to $300,000,000 and the issuance of $72,335,000 of twenty-year 4¼ per cent series A convertible bonds dated November 1 and maturing on November 1, 1949. The bonds will be convertible, from July 1, 1930, to July 1, 1940, into common stock at 105. They will be redeemable from 1934 to 1944 at 105. Preferred and common stockholders will have the right to buy the bonds to the extent of 40 per cent of their holdings. Kuhn Loeb & Co. has underwritten the offering. Proceeds of the bonds will be used for refunding securities of the C. & N. W. and of the Chicago, St. Paul, Minneapolis & Omaha.

KANSAS CITY SOUTHERN.—*Bonds.*—Interstate Commerce Commission has authorized the Arkansas Western to issue $425,000 of 6 per cent first mortgage bonds and to extend from June 1, 1934, to June 1, 1950, the maturity of $650,000 of 30-year 5 per cent first mortgage bonds, the interest rate to be raised to 6 per cent. The bonds will be deposited with the Kansas City Southern in payment for advances made for construction purposes.

LONG ISLAND.—*Stock.*—The Interstate Commerce Commission has authorized this company to issue $14,997,750 of common capital stock, par value $50. The stock is to be sold at not less than par and $13,465,180 of the proceeds are to be used to pay existing indebtedness, the remainder to be used to provide funds for over corporate purposes. The stock is to be offered to the applicant stockholders to the extent of 37.5 per cent of their holdings. Any stock not so subscribed is to be sold at par to the Pennsylvania, which owns 99.99 per cent of its existing stock.

MINERAL POINT & NORTHERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Highland to Highland Junction, Wis., 30.6 miles, and to discontinue operation under trackage rights over the line of the Chicago, Milwaukee, St. Paul & Pacific from Highland Junction to Mineral Point, Wis.

OKLAHOMA SOUTHWESTERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its entire line, from Bristow to Nuyaka, Okla., 28.31 miles, because the oil fields which formerly gave it much traffic have been abandoned.

PITTSBURGH & WEST VIRGINIA.—*Acquisition.*—This company, which on August 13, 1927, applied to the Interstate Commerce Commission for authority to acquire control of the Wheeling & Lake Erie, has filed an amended application setting forth the plan by which it proposes to acquire the stock. It proposes, with the approval of the commission, to purchase 76,795 shares of prior lien stock, 9,867 shares of preferred stock and 112,000 shares of common stock, described as being owned by the Baltimore & Ohio and New York Central and held by the Alleghany Corporation, for the sum of $21,362,638, plus interest at 6 per cent and less dividends paid on the stocks after February 26, 1929. It also proposes to acquire the 38,398 shares of prior lien stock, 4,933 shares of preferred stock and 56,000 shares of common stock held by the New York, Chicago & St. Louis for $9,749,018 plus interest and less dividends and to purchase 115,193 shares of prior lien stock, 14,800 shares of preferred stock and 168,000 shares of common stock for such prices as the commission shall fix, determine or approve. The application states that pending determination of this and other applications before the commission for authority to acquire control of the Wheeling company, referring to those of the Nickel Plate and the Wabash, it is unable to negotiate for the purchase of the stock, but that if the commission approves its application it will immediately acquire the stock purchased by the three trunk line roads, which has been placed in the hands of a trustee.

SEABOARD AIR LINE.—*Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue 400,100 shares of new common stock without par value, in exchange for the outstanding stock of a par value of $100 a share, together with additional shares to be offered in exchange in part for adjustment mortgage bonds and for subscription by the present stockholders of the company, in accordance with the plan for a readjustment of its financial structure.

SEABOARD AIR LINE.—*Reorganization of Capital Structure.*—This company and the adjustment bondholders committee announce that $21,146,000 or more than 84 per cent, of the adjustment bonds has been deposited under the refinancing plan and that steps will be taken to proceed with the plan. The privilege of making further deposits of these bonds will terminate on September 30, and if continued after that date will not be accepted on as favorable terms as those now offered.

SOUTHERN.—*Asks Dismissal of Clayton Act Complaint.*—This company has filed with the Interstate Commerce Commission a motion for a dismissal of the commission's amended complaint which alleged violation of the Clayton law in the acquisition of stock of the Mobile & Ohio and the New Orleans and Northeastern. The Southern says the commission has no jurisdiction in connection with the part of the complaint referring to acquisition of the Mobile & Ohio, because it was in 1901, many years before the passage of the Clayton act, and that the New Orleans & Northeastern is a feeder line coming within the exceptions of paragraph 4 of section 7 of the act.

TRINITY & BRAZOS VALLEY.—*Receiver's Certificates.*—The Interstate Commerce Commission has authorized this company to issue $648,560 of sixth series receiver's certificates, to be sold at face value and the proceeds used to meet the cost of relaying 50 miles of track with 90-lb. rail and building 55 box cars.

YANKTON, NORFOLK & SOUTHERN.—*Securities.*—The Interstate Commerce Commission has authorized this company to issue 6,667 shares of $100-par common stock; 4,000 of 7 per cent noncumulative preferred stock of $100 par; and $1,600,000 of first mortagage 6 per cent bonds.

A total of $100,000 of these securities are to be sold for cash to provide working capital and the remainder are to be delivered to a construction company in payment for constructing the line, stock to be disposed of at not less than par and bonds at a discount of not more than 20 per cent. The bonds will mature in 25 years.

Average Prices of Stocks and of Bonds

	Sept. 10	Last week	Last year
Average price of 20 representative railway stocks..	158.44	164.06	122.75
Average price of 20 representative railway bonds..	89.61	89.53	93.42

Dividends Declared

Boston & Maine.—7 per cent Prior Preferred, 1¾ per cent, quarterly; First Preferred Class A, 1¾ per cent, quarterly; First Preferred Class B, 2 per cent, quarterly; First Preferred Class C, 1¾ per cent, quarterly; First Preferred Class D, 2½ per cent, quarterly; First Preferred Class E, 1⅛ per cent; 6 per cent Preferred, 1½ per cent, quarterly; all payable October 1 to holders of record September 13.

Lehigh Valley.—Common, $.87½, quarterly; Preferred, $1.25, quarterly; both payable October 1 to holders of record September 14.

New York, Lackawanna & Western.—1¼ per cent, quarterly, payable October 1 to holders of record September 14.

Northern Pacific.—1¾ per cent, quarterly, payable November 1 to holders of record September 30.

Old Colony.—1¾ per cent, quarterly, payable October 1 to holders of record September 14.

Rutland.—7 Per cent Cumulative Preferred, $2.00, payable October 15 to holders of record September 30.

Railway Officers

Executive

L. E. Geohegan has been elected vice-president of the Tennessee, Alabama & Georgia, with headquarters at Chattanooga, Tenn.

Charles Elsey, vice-president of the Western Pacific in charge of finance, has been elected executive vice-president, with headquarters as before at San Francisco, Cal.

J. H. Hauberg, treasurer of the Natchez, Columbia & Mobile, with headquarters at Rock Island, Ill., has also been elected president of the New Orleans, Natalbany & Natchez.

W. G. Black, who has been appointed mechanical assistant to the president of the Chesapeake & Ohio and the Hocking Valley, with headquarters at Cleveland, Ohio, was born on April 19, 1877, at Lima, Ohio. After a public school education which was followed by a

W. G. Black

course in the Metropolitan Business College at Chicago, he entered railway service in 1893 as a machinist apprentice at the Stony Island (Chicago) shops of the New York, Chicago & St. Louis. In 1897 Mr. Black entered Armour Institute at Chicago, taking a post-graduate course in mechanical subjects, then later becoming a machinist at the Burnside (Chicago) shops of the Illinois Central. From 1900 until 1903 he was employed at the South Chicago plant of the Illinois Steel Company and in February of the latter year he reentered the service of the Nickel Plate as a machinist. Later in 1903 Mr. Black was promoted to machine shop foreman and in 1904 he was advanced to enginehouse foreman at Fort Wayne, Ind. On January 1, 1909, he was further promoted to master mechanic at the Stony Island shops, where he remained until February, 1923, when he became superintendent of motive power of the Nickel Plate and the Lake Erie & Western districts of the Nickel Plate, with headquarters at Cleveland. On January 1, 1927, Mr. Black's jurisdiction was extended to cover the entire system and in the following month he was appointed mechanical assistant to the president of the Erie, with headquarters at Cleveland, a position he held until his appointment to a similar position on the Chesapeake & Ohio and the Erie.

Financial, Legal and Accounting

F. E. Lee has been appointed treasurer of the Minarets & Western, with headquarters at Pinedale, Cal.

R. E. Moore has been appointed car accountant of the Belt Railway of Chicago, with headquarters at Chicago.

Alexander Taylor, secretary of the Algoma Eastern, with headquarters at Montreal, Que., has also been appointed secretary of the Algoma Central & Hudson Bay.

John A. Chambliss, chairman of the board of the Tennessee, Alabama & Georgia, with headquarters at Chattanooga, Tenn., has also been elected treasurer.

C. B. Friend, assistant auditor of disbursements of the Southern Pacific, has been promoted to auditor of capital expenditures, with headquarters as before at San Francisco, Cal. **H. C. McCleer** has been appointed auditor of miscellaneous accounts, with headquarters at San Francisco.

C. J. Rogers, purchasing agent of the White Pass & Yukon Route, with headquarters at Seattle, Wash., has also been appointed comptroller. **A. C. Blanchard** has been appointed general auditor, with headquarters at Skagway, Alaska, succeeding **G. H. Miller,** who retired from railway service on September 1.

Operating

E. D. Kirk has been appointed trainmaster of the Salt Lake division of the Southern Pacific, with headquarters at Susanville, Cal.

James Clifford has been appointed general manager of the Minarets & Western, with headquarters at Pinedale, Cal.

H. P. Hearon has been appointed assistant superintendent of the Pensacola, the Pensacola & Atlantic and the Southern Alabama divisions of the Louisville & Nashville, with headquarters at Pensacola, Fla.

E. E. Booth, superintendent of bridges, buildings and construction of the Beaver, Meade & Englewood, with headquarters at Fargan, Okla., has been appointed superintendent, with headquarters at the same point.

B. L. Tyler has been appointed acting trainmaster of the Chicago division of the Grand Trunk, with jurisdiction over the South Bend subdivision and with headquarters at Battle Creek, Mich., temporarily succeeding **J. M. Sommers,** who has been granted a leave of absence because of ill health.

J. E. Henderson, trainmaster on the Indian Territory division of the Chicago, Rock Island & Pacific, with headquarters at McAlester, Okla., has been transferred to the Arkansas-Louisiana division, with headquarters at Little Rock, Ark. **L. M. Tucker,** chief dispatcher at Shawnee, Okla., has been promoted to trainmaster at McAlester to succeed Mr. Henderson.

X. R. Campbell, trainmaster on the Central division of the St. Louis-San Francisco, with headquarters at Hugo, Okla., has been promoted to assistant superintendent of the Fort Worth & Rio Grande and the St. Louis, San Francisco & Texas, with headquarters at Fort Worth, Tex., succeeding **S. R. Kennedy,** resigned. **E. P. Olson,** dispatcher on the Frisco at Hugo, has been promoted to trainmaster at that point to replace Mr. Campbell.

Traffic

R. L. Chase has been appointed general agent of the Chicago, Springfield & St. Louis at Washington, D. C., a newly created position.

Floyd E. Carson has been appointed assistant general freight agent of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y.

W. C. Hetzler has been appointed general freight agent of the Tennessee, Alabama & Georgia, with headquarters at Chattanooga, Tenn.

J. O. Porter has been appointed assistant traffic manager of the Mississippi Southern, with headquarters at Lumberton, Miss.

A. W. Large, agricultural agent of the Chicago, Rock Island & Pacific, has been promoted to general agricultural agent, with headquarters at the same point.

J. L. Cook has been appointed assistant general freight agent of the St. Louis Southwestern, with headquarters at St. Louis, Mo., succeeding **P. G. Safford,** resigned.

F. J. Wasson, car accountant of the Belt Railway of Chicago, has been promoted to general traffic and industrial manager of that railroad and the Chicago & Western Indiana, with headquarters as before at Chicago.

C. E. Norris, general agent of the Chicago & Alton at Kansas City, Mo., has been promoted to executive general agent, with headquarters at the same point. **W. M. Randall,** commercial agent at Cincinnati, Ohio, has been promoted to general agent of the freight department at Pittsburgh, Pa. **L. V. Reef** has been appointed general agent at Cincinnati.

A. G. Anderson, district traffic agent of the Akron, Canton & Youngstown at Pittsburgh, Pa., has been promoted to assistant to the traffic manager, with headquarters at Akron, Ohio. **C. F. Jones,** district traffic agent at St. Louis, Mo., has been appointed Southwestern freight agent, with headquarters at Akron. **E. J. Hueting,** traveling freight agent at St. Louis, has been appointed Southern freight agent, with headquarters at Akron.

Walter S. Yeatts, assistant to the traffic manager of the Pennsylvania with headquarters at Philadelphia, Pa., has been promoted to the position of assistant freight traffic manager, with the same headquarters. **W. L. Buchanan,** milk agent with jurisdiction over the territory east of Altoona, south of New York and north of Washington, has been appointed milk traffic agent at Philadelphia, with system-wide supervision over the company's milk and cream traffic.

Mechanical

F. W. Buckpitt, assistant superintendent of shops of the Boston & Maine, with headquarters at North Billerica, Mass., has been promoted to the position of master mechanic of the Fitchburg division, with headquarters at Greenfield, succeeding **James S. Clark,** who has been assigned to other duties. **H. A. Sampsell,** general foreman of the Billerica shops has been appointed assistant superintendent of shops, succeeding Mr. Buckpitt.

The positions of chief of motive power and equipment and assistant to the chief of motive power and equipment on the Seaboard Air Line have been abolished. **C. S. Patton,** superintendent of motive power of the Northern district, with headquarters at Savannah, Ga., has been appointed to the newly created position of general superintendent of motive power, with the same headquarters. He will have jurisdiction over all officers and employees heretofore reporting to the chief of motive power and equipment. **F. P. Pfahler,** assistant to the chief of motive power and equipment, with headquarters at Savannah, Ga., has been appointed to the newly created position of assistant to the general superintendent of motive power, with the same headquarters. **E. H. Roy,** master mechanic of the South Carolina division, has been appointed superintendent of motive power of the Northern district, with headquarters as before at Savannah, succeeding C. S. Patton. **F. A. Weatherford,** general foreman of the locomotive department, has been appointed master mechanic of the South Carolina division, succeeding Mr. Roy.

Engineering, Maintenance of Way and Signaling

A. C. Garlington, superintendent of telegraph and telephone and signals of the Panama Rail Road, has been appointed electrical engineer, with headquarters as before at Balboa Heights, C. Z.

R. D. Copeland, assistant engineer maintenance of way of the Ann Arbor, with headquarters at Owosso, Mich., has been promoted to engineer maintenance of way, with headquarters at the same point.

George C. Stephenson, superintendent of the Port Reading creosoting plant of the Central of New Jersey, and the Reading with headquarters at Port Reading, N. J., resigned on September 1, to become connected with the American Tar Products Company, Pittsburgh, Pa.

R. B. Ball, chief engineer of the Coast Lines of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., has been promoted to assistant chief engineer of the Santa Fe System, with headquarters at Chicago. **M. C. Blanchard,** chief engineer of the Western Lines of the Santa Fe and of the Panhandle & Santa Fe, with headquarters at Amarillo, Tex., has been transferred to the Coast Lines to succeed Mr. Ball. **W. W. Kelly,** district engineer of the Coast Lines, with headquarters at Los Angeles, has been promoted to chief engineer of the Western Lines and the Panhandle & Santa Fe, succeeding Mr. Blanchard.

Special

C. T. Winkless, fuel agent of the Chicago Rock Island & Pacific with headquarters at Chicago, has been appointed secretary treasurer of the International Railway Fuel Association in place of L. G. Plant, president of the Railway Engineering Equipment Company, Chicago, who has resigned.

Obituary

Alfred Price, former general manager of the Eastern lines of the Canadian Pacific, with headquarters at Montreal, Que., died at Toronto, Ont., on September 2 after an extended illness which began while he was touring in France during the past summer. Mr. Price had been in the service of the Canadian Pacific for 43 years, from his entry into railway service in 1879 until his retirement in 1922. He was born on December 6, 1861, and during his first two years of railway work he was connected with the Credit Valley (now part of the Canadian Pacific) as an operator, messenger and clerk. From 1881 to 1898 he served successively as car accountant of the Credit Valley at Toronto and operator, relief dispatcher, train dispatcher, car distributor and chief dispatcher on the Canadian Pacific at the same point. He was then promoted to superintendent at Toronto and was later transferred to Fort William, Ont. In 1904 Mr. Price became superintendent of transportation of the Western lines and in 1907 he was promoted to general superintendent of the Central division at Winnipeg, Man. from 1907 to 1922 he advanced through the positions of general superintendent of the Alberta division at Calgary, Alta., assistant general manager of the Eastern lines and general manager of the Eastern lines.

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On the Pennsylvania